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ABSTRACT

The feasibility of youth apprenticeship in the United States was assessed by examining problems and successes of programs that include components of the apprenticeship model. The approach to analysis of youth apprenticeship was to break down the model into four components: student participation, educational content, location of instruction, and credentialling. Four types of school-to-work models that share characteristics with the apprenticeship model were examined: agricultural education, cooperative education, high school career academies, and tech prep. The analysis yielded the following findings: (1) the successes of career academies, tech prep, and agricultural education provide feasible models for combining practical and academic learning; (2) cooperative education often involves little coordination between workplaces and classrooms; (3) more extensive employer involvement is necessary; (4) programs providing a broad educational foundation have difficulty meeting occupation-specific credential standards; and (5) existing models often perpetuate divisions between types of students, and when they include college-bound students, they often exclude less academically oriented students. One of the most serious potential problems with the model concerned location of instruction: whether the workplace could effectively provide a significant portion of the education for a large segment of youth. Problems with developing appropriate credentials were also far from being solved but could only be confronted seriously when more progress had been made on the issues of target group, content, and location. One strategy was suggested to develop a large-scale youth apprenticeship system in which a significant part of the learning takes place on the job: build on the primarily school-based models such as academies and tech prep. Key research areas were identified. (Contains 149 references.) (YLB)

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The School-to-Work Transition and Youth Apprenticeship: Lessons from the U.S. Experience

Thomas Bailey
Donna Merritt

U.S. DEPARTMENT OF EDUCATION
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SCHOOL-TO-WORK TRANSITION PROJECT

THE SCHOOL-TO-WORK TRANSITION AND YOUTH APPRENTICESHIP: LESSONS FROM THE U.S. EXPERIENCE

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March 1993

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PREFACE

High on today's domestic policy agenda is the tough problem of preparing our youth for productive, high-wage employment in the extremely competitive U.S. and world economies. This school-to-work policy challenge cuts across the fields of secondary and higher education, training, and economic policy. Yet, at a time when policymakers and the public agree that strong and effective action is needed, there is little information and evidence that can tell us what approaches will work best for the nation.

With support from The Commonwealth Fund and the DeWitt Wallace-Reader's Digest Fund, the Manpower Demonstration Research Corporation (MDRC) is working to address this critical policy challenge through its School-to-Work Transition Project, an in-depth examination of innovative programs around the country and of the roles of states and employers in these initiatives. Our goal is to bring to the field of education policy the same kinds of careful, nonpartisan, policy-relevant information that has been MDRC's trademark in other policy areas.

Policymakers have heard extensive discussion of European school-to-work models, but relatively little attention has been paid to models and experiences in our own country. To inaugurate MDRC's school-to-work project, we asked Thomas Bailey and Donna Merritt of Teachers College and Conservation of Human Resources, Columbia University, to look at the current policy debate through the lens of established programs in the United States.

Bailey and Merritt ask an uncommon question: What can we learn from existing U.S. programs that combine schooling with work in their effort to prepare students for high-wage employment? Their unique approach draws lessons from some unexpected sources – the long-established agricultural education (4-H) and cooperative education movements, and the newer career academy and Tech Prep models. Because these models are already part of the nation's education system, they foreshadow the opportunities and problems that any new school-to-work initiative is likely to encounter.

The monograph's findings are important:

- Efforts to break down the traditional segregation of academic and practical learning have been met with success in career academies and Tech Prep programs, and agricultural education provides a little-recognized example of academic-occupational integration strategies that build leadership and citizenship skills. These successes show that American education *can* combine practical and academic learning, and they provide feasible models for achieving

this goal. In cooperative education programs, which focus on the work experience itself, there is often relatively little coordination between students' workplaces and classrooms.

- None of the established school-to-work models have yet attained the ambitious level of employer involvement that is necessary for true on-the-job pedagogy. It seems likely that the interests of employers and students in high-intensity training may differ. However, the institutional relationships created by existing school-to-work programs offer a base on which more extensive employer roles can be built.

- Credentialing efforts are currently ad hoc. The programs that strive to give students a broad educational foundation have difficulty meeting occupation-specific credential standards. There are important disagreements over the purpose and content of programs that must be resolved in tandem with efforts to establish new credentials.

- While existing U.S. school-to-work models have successfully involved a wide range of students, there is evidence that the division between types of students is often perpetuated in these programs, and that when programs have tried to include college-bound students they have often excluded less academically oriented students.

Bailey and Merritt are cautiously optimistic about the feasibility of developing school-to-work models that meet the needs of the diverse U.S. student population and provide much-needed preparation for high-wage, productive employment. They point to the progress that has already been made, often without much attention from policymakers, and they underline the importance of learning the lessons these programs have to teach us – lest we be condemned to reinvent the wheel.

This monograph shows us that homegrown experiences are an extremely valuable source of school-to-work insights. For this reason, MDRC's ongoing studies of school-to-work initiatives are designed to learn about the effectiveness, implementation, and costs of U.S. programs. Future reports in this series, to be released later in 1993, will provide how-to-do-it advice on establishing work-based learning programs, and a detailed examination of how 15 programs are working, with an analysis of the roles of states and employers. We hope that the series helps lay the groundwork for policymakers to address the critical unmet needs of our nation's youth.

Judith M. Gueron
President

I. INTRODUCTION

Over a decade into a widespread national movement for education reform, the U.S. school system continues to draw fire from critics who argue that it is unable to prepare the nation's workforce or to teach even the basic skills on which a democratic society must be based. Since the mid-1980s, reformers have been particularly concerned with the education of the broad group of young people not headed for four-year baccalaureate degrees. U.S. colleges and universities are still believed to be among the best in the world, but the educational institutions that serve the so-called non-college-bound suffer in comparison to corresponding institutions in Europe, Japan, and some other Asian countries (Commission on the Skills of the American Workforce, 1990; National Commission on Excellence in Education, 1983; William T. Grant Foundation Commission on Work, Family and Citizenship, 1988). Superior schools for this population are believed to give these countries an important economic edge over the United States.

Education models designed to serve non-college-bound students are often referred to as "school-to-work transition" models. These include high school career academies, Tech Prep programs, cooperative education, high-quality urban vocational schools, and other strategies that offer an alternative to traditional college-preparatory academic programs.[1]

One particular school-to-work transition model – youth apprenticeship – has attracted a great deal of favorable attention. This strategy is inspired by the German dual (apprenticeship) system,

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[1]These are called school-to-work transition programs because their orientation toward work and occupational education is believed to help youth make the transition into the workplace. We use the term in this paper because it is widely used in the relevant policy discussions. Nevertheless, it is misleading for several reasons. First, it evokes an image of a one-time shift from school to work. However, most individuals combine schooling and work for long periods of time or they shift back and forth between the two. The notion that we learn and then we work is increasingly inaccurate as many individuals continue to receive both formal and informal instruction from their employers. Second, the concept of school-to-work transition focuses on the transition itself. Career counseling for seniors in high school or placement assistance are short-term activities that explicitly help students make a transition from school to a job. Yet education programs such as high school career academies or youth apprenticeships can last for several years, thus minimizing the notion that an explicit transition takes place and suggesting that a better term might be "preparation for work" programs. But why should these programs be viewed only as preparation for work? The personnel who operate school-to-work transition programs all argue that their programs should serve equally well to prepare students for both work and college. We believe that it is more consistent with the current thrust of education innovation to cast this paper's discussion in terms of general education reform, rather than continuing to make the increasingly vague and misleading distinction between college-bound and non-college-bound or between preparation for work and preparation for college.

which is the basis of the education system for most late adolescents and young adults in that country.[2] Although there is no fixed definition of youth apprenticeship in the United States, a consensus seems to be emerging around four basic principles or components: youth apprenticeship is a strategy that would target a broad range of students; its educational content would integrate academic and vocational, or theoretical and practical, instruction; a significant part of an apprentice's education would include guided learning and experience on the job; and students would emerge from their apprenticeships with a recognized and accepted credential. We refer to these four components as student participation, educational content, location of instruction, and credentialing.

Youth apprenticeship is not an expansion of the traditional apprenticeship system currently used in the United States. Youth apprenticeship is designed to be part of the basic education of a significant proportion of adolescents, while current U.S. apprenticeships are designed to serve the labor supply needs of specific occupations (about one-half of all apprentices are in construction occupations). In 1989, traditional apprenticeship programs enrolled only about one-third of a million students. The average age of U.S. apprentices that year was 29, and many already had a high school degree (U.S. Department of Labor, 1989).

The purpose of this paper is to assess the feasibility of the youth apprenticeship model in the United States by examining U.S. programs that include some components of the model. This is a unique approach. The traditional strategy has been to study and describe European apprenticeship systems and to suggest how they might be applied to the United States. Since the mid-1980s, hundreds of academics and policymakers have traveled to Europe to learn about apprenticeship systems in Germany and other countries, hoping to derive relevant lessons for U.S. education reform. An alternative approach, followed by the U.S. Department of Labor and several private foundations, has been to establish pilot projects in the United States to create an opportunity to evaluate the feasibility and effectiveness of youth apprenticeship.

In contrast, our strategy examines almost exclusively experience with existing educational strategies in the United States, through separate analyses of the four components of the youth apprenticeship model – student participation, educational content, location of instruction, and credentialing. Prior to the recent pilot projects, there have been no youth apprenticeship programs in this country that combine all the components, but educators do have considerable experience with

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[2]Two-thirds of German youth enter the dual system at about the age of 16. The system is based on apprenticeships that last three or four years in which the apprentices spend one day a week at school and four days a week on the job. According to the model, the work should involve systematic learning that is coordinated with the classroom instruction.

each of the components individually or in some combination. It is this experience on which we base our analysis. Rather than asking how a comprehensive youth apprenticeship model *would* work in the United States, we assess the feasibility and experience of each of the four components as they *do* work currently in U.S. educational institutions. We focus on four educational strategies that share at least some features with youth apprenticeship – the Tech Prep model, high school career academies, cooperative education, and agricultural education. We recognize that it can be misleading to predict the effects of a comprehensive program by examining its constituent components individually. Nevertheless, there is much to be learned from an analysis of the components, especially since barriers to the implementation of one of the components are likely to remain when the components are combined.

In the remainder of this introduction, we discuss the definition of youth apprenticeship used in this paper and provide some background on the interest in apprenticeship in the United States. We also explain in more detail our approach to the analysis and the framework (the four components) on which it is based, including the specific questions that we try to answer about each component. In Section II, we briefly describe the four education strategies from which we draw our evidence. Sections III through VI discuss the U.S. experience with each of the four components as they specifically relate to these strategies. We end in Section VII with some suggestions for policy, research, and evaluation.

What Is Youth Apprenticeship?

Youth apprenticeship is such a new concept that proponents have yet to agree on an exact definition. Jobs for the Future (JFF), a nonprofit organization that studies and analyzes workforce preparation and development, states that youth apprenticeship should be based on the following six principles:

1. Collaboration among secondary schools, post-secondary educational institutions, and employers;
2. Provision of work-based training by employers as part of the program;
3. High-quality, integrated academic and occupational education;
4. A focus on preparation for high-skilled occupations;
5. Certification of occupational as well as academic skill levels of participating young people; and

6. An attempt to reach back into the early secondary- or middle-school years and to link youth apprenticeship to a broad strategy of career exploration (Kazis, 1991).

Stephen Hamilton argues that an effective apprenticeship system should:

1. Exploit workplaces and community settings as learning environments;

2 Link work experience to academic learning;

3. Give youth constructively ambiguous roles as, simultaneously, workers with real responsibilities and learners; and

4. Foster close relationships between youth and adult mentors (Hamilton, 1990).

Bills introduced in the U.S. Congress to promote youth apprenticeship contain various definitions. For example, the National Youth Apprenticeship Act introduced in May 1992 defines youth apprenticeship as:

> a program that integrates academic instruction and work-based learning; provides for work-site learning and paid work experience; is offered to students beginning in the 11th and 12th grade; is intended to result in the receipt of a high school diploma and an approved certificate of competency; and leads, as appropriate, to entry into a postsecondary program, a program registered under the National Apprenticeship Act, or permanent employment.

Another proposal, the Youth Apprenticeship Act, introduced in November 1991, authorizes demonstrations that:

> provide training at work sites for students in the eleventh and twelfth grades, in combination with high school courses . . . so that students gradually increase the time spent at work sites from 30 percent in eleventh grade to 50 percent in the twelfth grade . . . and graduate and receive a high school diploma with other members of their class.

Similarly, the School to Work Transition and Youth Apprenticeship Act, introduced in April 1992, defines youth apprenticeship as:

> an employer-school partnership preceded by career exploration, that integrates academic instruction, structured job training, paid work site experience, and work experience; is offered to students beginning in the 11th or 12th grade; and results in receipt of a high school diploma and receipt of an approved certificate of mastery (where appropriate), entry into a postsecondary program, or permanent employment.

Regardless of the formal definition, three components are at the heart of the youth apprenticeship movement – the integration of academic and vocational coursework, a more active educational role

for the workplace, and recognized academic/vocational credentials for students who successfully complete the program.

Advocates of youth apprenticeship argue that it will improve preparation for work and facilitate the transition to work for many students. But it is also seen as the possible basis for general reform that can improve the education system for almost all students. Consequently, our analysis is based on the general definitions outlined above with the addition of the principle that youth apprenticeship should be targeted to a broad range of youth, a principle that is widely accepted among those who favor the model. To summarize, the framework used in our analysis includes the following four components:

> **Student participation**. Youth apprenticeship is designed to be an integral part of the basic education of a broad cross section of youth. It should not be limited to narrowly defined target groups such as "at-risk" youth.[3]
>
> **Educational content**. Apprenticeship combines, in an integrated and coordinated way, conceptual or theoretical education with practical or specific education, sometimes referred to as the integration of academic and vocational education. Apprenticeship programs are also designed to teach broader employability and social skills.
>
> **Location of instruction**. In apprenticeship, a significant part of the basic educational program of the participating youth takes place on the job.
>
> **Credentialing**. Graduating apprentices should acquire a credential that is recognized by a wide range of employers as certifying the achievement of a given level of skill.

Many current proposals for education reform share some of these characteristics. However, the characteristic of youth apprenticeship that differentiates it from other school-to-work transition programs such as the academy model is the primary role of the workplace in the students' educational program. In youth apprenticeship, a significant amount of the students' formal education actually takes place on the job. Moreover, learning in the workplace is explicitly coordinated with instruction in the classroom.

U.S. Interest in Youth Apprenticeship

As late as the early 1980s, apprenticeship was simply not on the education reform agenda.

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[3]In this paper, the term "at risk" is used to denote those students who, because of low grades, lack of interest in school, personal problems outside school, financial concerns, etc., are at risk of dropping out of high school. In effect, this group is a more disadvantaged subset of the non-college-bound, who are believed also to be at risk of reduced future earnings and employment potential.

Interest in apprenticeship as a basis for broad and progressive education reform resulted from the diagnosis of the weaknesses of U.S. education, from the perception that the European apprenticeship systems avoid many of these weaknesses, and from a growing body of research in the United States on the educational advantages of integrating school instruction with nonschool experiences at work.

What Is the Problem with the U.S. Education System?

Much of the concern about the U.S. education system is focused on students who do not end up in college – the non-college-bound. The high schools that many of these students attend are considered weak, failing to teach the specific or, in many cases, even the general skills needed in the modern workplace (Commission on the Skills of the American Workforce, 1990; National Commission on Excellence in Education, 1983; William T. Grant Foundation Commission on Work, Family and Citizenship, 1988). Nor do they provide any strong motivation or incentives for students to work hard (Rosenbaum, 1989). Consequently, too many students graduate who never actually "complete" high school. Moreover, even for those who do, there is no institutional mechanism to move students from school into the workplace. While the college-bound student has the help of a guidance counselor whose job is to shepherd juniors and seniors through the college application and selection process, young people who want to work after they graduate from high school are on their own. As a result, they often spend a few years drifting from one unskilled "youth" job to another. These "McJobs" are thought neither to require nor to teach skills. And since they are dominated by youth, the young workers get little chance to work with mature adult role models. Most Americans do end up in more stable "adult" or "career" jobs, where they begin to pick up more advanced skills, by their mid- to late twenties, but by this time they have forgotten many skills they learned in high school.[4] Overall, this system is believed to result in wasted time, delayed maturity, and training that is haphazard and, in most cases, does not result in any recognized credential or certification.[5] The absence of recognized credentials for many skilled workers is considered a serious labor market inefficiency, since employers have no easy method for evaluating the skills of prospective workers.

Youth Apprenticeship: A Foundation for Education Reform

European youth apprenticeship systems appear to avoid most of these problems. Although

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[4]This perspective is most cogently developed by Stephen Hamilton in his book *Apprenticeship for Adulthood* (1990).

[5]Some economists argue that the apparently high employment turnover among young workers is the result of an efficient and productive process of job shopping through which young people acquire information about the world of work and alternative occupations.

several European countries use apprenticeship extensively, the German system is the best known in the United States and is most often cited as a model for U.S education reform.[6] In Germany, 70 percent of 16- to 18-year-olds are enrolled in the apprenticeship system. Apprenticeships last two to four years and over three-fourths of student training takes place at work. Apprentices spend one or two days a week in a vocational school, where they are taught material related to their job. On-the-job training occurs under the supervision of certified trainers, and the training program is set by a federal regulatory agency – the Bundesinstitut fur Berufsbildung (BiBB) – but supervision of the curricula is the responsibility of local quasi-public employer organizations – chambers of commerce and industry or chambers of crafts. Although the chambers are primarily employer organizations, their apprenticeship committees include representatives of unions and schools. The participating companies and the trainers employed by them must be certified by these local chambers. Apprentices receive only a training allowance, which averages between 20 and 40 percent of the average national wage for the relevant occupation. Employers and unions set the training wage in sectoral collective bargaining.

In the German system, adolescents are quickly moved into the workplace, where they can see the relevance of their studies and immediately apply school-learned skills and knowledge. They have intensive interaction with mature role models. The formal arrangements between employers and schools create an institutional link between the classroom and the workplace that is missing in this country. Furthermore, German apprenticeship provides a credential that is developed jointly by representatives of industry, organized labor, and education, and that is recognized throughout the country. Sixty percent of the youth trainees actually work in occupations for which they were trained and 60 percent possess what employers consider intermediate skills (Hamilton, 1990). The strategy is also a vehicle for the involvement of employers in education, since they have educational responsibility nearly equal to that of school-based educators.

Advocates of the German system argue that, in addition to being an excellent means for preparing the workforce, it is also a superior system for providing a general educational foundation. Based on solid basic skills preparation from earlier schooling, apprentices not only learn relevant occupational skills, but, through their guided work experience, they are also socialized into the working world, learning how to be effective and mature workers and learners in an authentic environment.

Additionally, growing German prosperity and economic prowess, especially in manufacturing,

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[6]This description of the German dual system is drawn from Faist (1992a, 1992b).

give the workforce preparation system an underlying aura of success. As a result, many advocates believe that strengthening education through apprenticeships would make the United States more competitive in international markets.

Cognitive Science Research

An increasingly influential stream of research on learning has also provided support for the apprenticeship model. Since the mid-1980s, researchers have argued that there is a wide gap between the skills learned in the classroom and those used on the job. At best, students learn the skills they need to perform well in school, but those skills may not serve them well outside of school – learning is not "transferred" (Resnick, 1987a, 1987b). The emphasis on integrating academic and vocational education is one approach to bringing together the worlds of work and school. The "contextual learning" movement in basic skills education is based on the notion that individuals learn basic skills more effectively if they are taught in close relationship to their everyday activities (Sticht, 1989). Thus, schooling as it is currently organized and administered is seen as artificial or unauthentic, failing to teach students many of the social and intellectual skills that they will use both on the job and in their everyday life (Berryman and Bailey, 1992; Raizen, 1989; Collins, Brown, and Newman, 1989).

By incorporating education into "real world situations in which what is being learned will be used" (Resnick, 1987a), apprenticeship appears to bridge this intellectual or cognitive gap between school and work (or, more broadly, social activity in general). This is a much more encompassing justification for work-based education than the argument traditionally advanced by advocates of vocational education, that academic schooling does not teach "useful" or "marketable" skills. These newer arguments suggest that traditional schooling (academic as well as vocational) prevents the full development of each student's cognitive abilities. Thus, from this point of view, appropriately organized and structured apprenticeships and other types of work-based education are not simply good ways to teach the non-college-bound high-quality vocational skills, but they are also valuable educational strategies for the intellectual development of a wide range of students. The general notions about situated learning and contextualized education have created a sympathetic intellectual environment for the apprenticeship discussion.

Apprenticeship also breaks the isolation of schools. By structuring an institutional relationship between employers and schools, apprenticeship promotes a more interactive flow of information between the two sets of institutions. This type of interaction has many benefits. Schools are more in touch with the types of skills needed on the job; employers benefit from their own efforts to train their workers; and a student's record in school might have more meaning to employers, giving

students more incentive to work hard. And with closer links to employers, schools are in a better position to help students find jobs.

Indications of Growing U.S. Interest in Apprenticeship

For all of these reasons, interest in apprenticeship in the United States has grown dramatically. Hamilton's book *Apprenticeship for Adulthood* (1990) and Lerman and Pouncy's *Public Interest* (1990) article, "The Compelling Case for Youth Apprenticeships," have been widely circulated and discussed. Based on analysis of education in Germany, the U.S. General Accounting Office (1990b) suggested the expansion of apprenticeship-type programs for high school students. A 1991 follow-up report emphasized the potential for apprenticeship, specifically through the development and expansion of cooperative education programs in the United States (U.S. General Accounting Office, 1991).

The U.S. Department of Labor has created an Office of Work-Based Learning that has mounted several pilot projects and statewide demonstrations to promote and test apprenticeship-like models, and the U.S. Department of Education is supporting the development of school-to-work transition models in vocational education programs. Both departments are also supporting other research on work-related learning and school-to-work transition. Significant apprenticeship legislation was introduced in Congress in 1992 by influential Republican and Democratic members. These proposals included a major initiative by the Bush administration and a key proposal by Senator Ted Kennedy, chairman of the Labor and Human Resources Committee. Because both parties have major apprenticeship initiatives, the topic is likely to be high on the presidential and congressional agendas.

Foundations are also involved in the effort. They were instrumental in generating the current interest in youth apprenticeship in the United States and have invested heavily in several key projects. Virtually every major foundation with an interest in social policy has some involvement with demonstration projects or research related to strategies based on some variant of apprenticeship. At least 13 national and regional foundations and as many organizations are involved with school-to-work transition. Three of the most ambitious initiatives funded by foundations are those being conducted by Jobs for the Future (JFF), the Council of Chief State School Officers (CCSSO), and the Manpower Demonstration Research Corporation (MDRC). JFF will be providing technical assistance and guidance to at least 15 local work-related learning projects in 12 states. CCSSO is currently supporting efforts to embed youth apprenticeship in the broader education framework through pilot efforts in five states. MDRC is examining a variety of school-to-work models to learn about the

participation and role of schools, employers, and students, especially youth at risk of school failure.

Problems with the German Analogy

Much of the support for apprenticeship in the United States is based on the perception of the success of the German system, yet significant differences between the U.S. and German economies, society, and labor market institutions call the German analogy into question. Cultural and historical differences proliferate throughout the arenas of work, education, and politics, causing a disparity in the popularity of educational programs such as apprenticeship.[7] In contrast to the United States, where union membership and influence are shrinking, German unions play a central and widely accepted role in the labor market. These organizations are crucial for the operation of the German apprenticeship system. Employers are required by law to join employer organizations (chambers), which also play a central role in designing and regulating apprenticeships. Many companies in Germany have a long-term perspective on their employees' tenure and therefore are willing to absorb much of the cost of on-the-job training, while U.S. firms are more likely to fear that trained workers will leave, taking their expensive skills with them. U.S. employers consequently have an incentive to offer only minimum amounts of training. There are no uniform, nationally accepted certification standards in this country like those in Germany, only standards developed by voluntary national associations or unions which are enforced almost exclusively at the local level.[8]

An Alternative Research Strategy

While U.S. policymakers and educators have learned a great deal from studying the German apprenticeship system, the dissimilarities between the two countries pose significant limits to the usefulness of the lessons from Germany. Therefore, what we will attempt to accomplish in this paper is an analysis of apprenticeship based on school-to-work programs in the United States. We suggest that a great deal remains to be learned from a solid investigation of the history and dynamics of

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[7]Although apprenticeship systems in other European countries have not attracted as much attention as the German system, the economic and social environment in those other countries may be closer than the German environment to conditions in the United States. This suggests that it may be time to reduce the emphasis on the German model and focus on alternative European approaches.

[8]In Germany, competency and training standards are established by the Federal Institute for Vocational Training (BiBB), an agency that includes employer, union, and government representatives. The certification system is not only responsive to the needs of German employers but validates training for apprentices as well. The United States developed federal regulations in 1977 for adult apprenticeship programs, specifying hours of instruction for on-the-job training, but no actual curricula or examinations were certified or agreed upon. So far, no nationwide standards have been attempted for youth apprentices (Hamilton, 1990).

programs within the U.S. educational system. Since no comprehensive youth apprenticeship system exists in the United States, our strategy is to learn something about the feasibility of youth apprenticeship in this country by examining the problems and successes of programs that include components of the apprenticeship model.

The Youth Apprenticeship Model

Earlier we briefly outlined the four components of the apprenticeship model. Below we discuss them in more detail and present the specific questions that we seek to address in this paper.

1. Student Participation. If youth apprenticeship is to be the basis for general education reform, it will become part of the basic educational preparation of a broad segment of the population – at least a close adjunct to the universal secondary school system now in place in the United States. Given this broad mandate, what student population will participate in youth apprenticeship?

Programs in the United States aimed specifically at youth with serious economic problems or those who are considered at risk of dropping out of high school must confront a general negative image. Many employers believe that these programs are for "problem" youth, and the stigma of participating in them often overshadows the benefits (Burtless, 1985). Thus, apprenticeship advocates have taken pains to emphasize that youth apprenticeship cannot be exclusively for students with serious economic or education problems.

German apprenticeships are embedded in an educational system based on explicit tracking of students into specific career paths. Whatever the possible benefits of such tracking, it is anathema to U.S. education reformers. Even programs aimed at the non-college-bound in general, as opposed to the narrower "at-risk" group, suffer from the stigma described above – a significant problem for vocational education programs, which often take on a "dumping ground" image. Consequently, no broad reform will come about that is openly based on more or less irreversible tracking of young adolescents.

As a result, an apprenticeship system with a realistic chance of widespread acceptance will probably have to include college-bound students. After all, we have argued that one of the most important emerging justifications for apprenticeship is the notion that traditional academic education limits the intellectual development of all students. If this is to be taken seriously, then apprenticeship cannot be limited to the non-college-bound. Indeed, some apprenticeship pilot projects have emphasized the importance of designing their programs to facilitate the transition to post-secondary education, and apprenticeship advocates have begun to emphasize that even in Germany graduates of apprenticeships can rise to higher-level positions, and that some students in the elite secondary

schools are also choosing to sign on as apprentices. But increased focus on the college-bound creates the risk of a selective admissions process that excludes less accomplished students who could benefit – a process known as creaming. Thus, a central question that we must address is whether it is possible to develop a broad youth apprenticeship program that finds a middle ground between the stigma of a "second-best" track and the restrictiveness of an elite, selective educational program for the best students.

In the United States, any education issue involving tracking and selection for particular programs will also be concerned with problems of racial discrimination. Minority underrepresentation in traditional apprenticeship programs in the United States has been a controversial social issue for 30 years. Throughout this period, some unions have engaged in overt attempts to limit minority enrollment, but they have not been alone (Waldinger and Bailey, 1991). For example, under-representation of blacks in nonunion construction apprenticeships is even worse than in those organized by unions. And, at least in New York State, the barriers to blacks in nonconstruction apprenticeship programs appear to be even more formidable than those in construction programs (Bailey and Waldinger, 1989).

The experience of Turkish and other immigrant youth in the German apprenticeship system should also serve as a warning. In 1990, less than 30 percent of 15- to 18-year-old Turkish youth were in the dual system, while over two-thirds of the entire population in that age group were apprentices. Among those who were in apprenticeships, Turks and other immigrants were concentrated in the lower-skilled jobs and those with more restricted future opportunities.[9]

Another indication of inequality is Turkish representation in apprenticeships in the two broad sectors of employers – "craft" *(Handwerk)* and "industry and commerce" *(Industrie und Handel)*. Apprenticeships in the craft sector are more likely to be in smaller firms that view apprentices as low-cost workers rather than as future skilled employees; apprentices in this sector are less likely to remain with the firm that trained them after completing their apprenticeship. Therefore, apprenticeships in the craft sector are less desirable than placements in the industry and commerce sector. In 1987, only 35.5 percent of German apprentices were in the craft sector, compared to 54

[9]Young immigrant men tend to cluster in occupations such as auto mechanics, and young women in jobs such as hairdresser. In 1989, 5.4 percent of all apprentices, but 18.3 percent of the hairdresser apprentices, were immigrants. Turkish apprentices are concentrated in those occupations that offer little hope of transition to the status of "skilled worker" (*Facharbeiter* in blue-collar occupations and *Angestellte* in white-collar occupations). These were also the areas that in the 1980s consistently led in unemployment among young people who had successfully completed apprenticeships.

percent for immigrants.[10] Turks were almost completely absent from apprenticeships in the advanced service sectors such as banking and insurance.[11]

Although, as we have emphasized, there are problems with the German analogy, the experience of minorities in current U.S. apprenticeships and in the German system serves as a warning about the potential problems of greater integration of schools and the workplace. Even though schooling in the United States is highly unequal, the inequality and stratification in the workplace are even more extreme. Despite its problems, in the context of the broader society, the education system has been used to open opportunities for poor and minority students. Will that role be weakened if schooling for a large number of students is institutionally integrated into the workplace? This issue will not be addressed in detail in this paper, but it is a problem that must be confronted as reformers develop apprenticeship programs and strategies.

2. Educational Content. The apprenticeship model thrives on creating an institutional linkage between broad-based, academic learning and skill-specific, work-based training. Apprenticeship attempts to find a balance between two historically bipolar types of learning: academic, theory-oriented education and vocational, application-oriented education. The emphasis on this approach goes beyond the youth apprenticeship strategy. The central thrust of the 1990 amendments to the Carl Perkins Act, the federal law that provides funding for vocational education, is a call for the integration of academic and vocational education.

Although the desirability of combining theoretical with practical education hardly seems controversial, an integrated system could occupy an infinite number of points on a wide continuum between purely academic and purely vocational. For example, is the academic education in an apprenticeship program primarily an underpinning for the specific skills associated with the occupation, or is the practical instruction a vehicle for teaching broader conceptual, social, and problem-solving skills? The logic of a broad youth apprenticeship system for late adolescents would seem to point to an emphasis on broader skills.[12] This might involve grouping students in

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[10]Data compiled by Thomas Faist from Statistisches Bundesamt (1989).

[11]For an extensive discussion of immigrants in the German system, see Faist (1992a, 1992b).

[12]Vocational education in general is moving away from a narrow occupational focus. For example, the 1990 amendments to the Carl Perkins Act call for vocational educators to incorporate instruction for "all aspects of the industry." According to this thinking, vocational students should not only be taught the essential skills for the jobs for which they will immediately be qualified upon graduation, but also more general skills applying to their industry that will assist them in moving beyond their initial entry-level jobs. Examples of these types of skills are management, planning, finance, and underlying principles of technology, which are taught in a "cluster" format, providing students with an initial understanding of the breadth and depth of issues in their industry.

occupational clusters rather than according to specific jobs. Apprenticeship advocates point out that the German system is moving away from an organizational structure using hundreds of specific job titles to one based on a much smaller number of occupational groups. But where does this leave the actual educational preparation for real-world jobs? The central question here is whether it is possible to design a curriculum that combines academic and vocational components without sacrificing quality at either end. Can educators avoid developing a strategy that tries to teach both academic and vocational skills but teaches neither well?

3. Location of Instruction. In the apprenticeship model, the workplace is a learning place, not simply an environment where students gain practical experience and specific job skills. Teaching in school and activities on the job are explicitly coordinated to strengthen the learning in both places. The classroom and the workplace reinforce each other.

Although an approach that coordinates learning on the job and in the classroom has great appeal, there are two potential problems. First, can enough employers be recruited to provide apprenticeship slots for millions of young students? Experience in the past suggests that recruiting and retaining participating employers is difficult. Second, what is the quality of learning that takes place on the job? If workplaces are going to provide a significant portion of the education of the nation's youth, then some methods must be developed to monitor and strengthen the learning that takes place there.

4. Credentialing. Without exception, those who promote the youth apprenticeship model call for the development of recognized exit credentials for those who participate. Unlike the more traditional vocational education programs, which vary widely, the proposed apprenticeship model will provide more solid, established outcomes that allow graduating students the option of either pursuing further academic or vocational training, or entering the workforce with the skills necessary to obtain a position with some upward mobility. Those who continue their specific occupational training will be prepared for beginning journeyman training, or have the proper knowledge base to begin community college studies. Students who choose to continue their academic education in a four-year institution will have met the requirements for doing so.

However, the diverse goals of the apprenticeship model create a variety of problems for the issue of credentialing. One problem concerns whether the credential will be nationally recognized or whether states will draft independent standards. But perhaps even more important is the issue of how broad or narrow the credential should be. Will it signify preparation for a specific occupation or job, or will it be a much more general certification, something like a degree from a high-quality

secondary school? Perhaps it should occupy a middle ground and demonstrate knowledge about a broad industry area? As in the case of the balance between academic and vocational education, educators need to be sure that an apprenticeship does not sacrifice quality for breadth.

II. SCHOOL-TO-WORK MODELS IN THE UNITED STATES

In this section, we briefly describe four types of programs that share characteristics with the apprenticeship model, providing some background for the reader not familiar with these strategies.[13]

Agricultural Education

The oldest form of vocational education in the United States is facing perhaps its greatest challenges as it enters the 21st century (Roegge and Russell, 1988). Agricultural education must not only overcome the negative perceptions associated with vocational education, but must also find ways to circumvent the public apathy concerning an industry in which employment is dwindling – agriculture. A vocation that was once handed down through generations, employing 25 percent of the nation's workforce in 1930, has become an occupation made nearly obsolete by mechanization (Rosenfeld, 1983).[14] Based on what many perceive as agriculture's less commanding and pivotal role in the domestic economy, "much of America believes that scant opportunities will befall students enrolled in vocational agriculture and colleges of agriculture" (Schumacher and Kahler, 1989).

Indeed, enrollment in agricultural education has declined as the prospects for employment and prosperity in agriculture have deteriorated. Midwestern states such as Illinois, traditionally known for their agricultural contribution to the labor pool, have witnessed a decline in participation in vocational agricultural programs, from 24,700 in 1980 to 15,800 in 1985 – a 5.6 percent annual rate of decrease (Roegge and Russell, 1988). Pennsylvania also reports sharp declines in vocational agricultural enrollments (Fox, 1989). Secondary-school principals in Michigan surveyed in 1988 reported a 40 percent drop in secondary vocational education enrollment between 1979 and 1985, with local public school decisions leading to the overall elimination of more agricultural education programs than were added (Bobbitt, 1988).

Perhaps dwindling employment in agriculture, especially on the family farm, explains why

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[13]For a more detailed description of agricultural education, see Cheek (1979); of cooperative education, see U.S. General Accounting Office (1991); of career academies, see Dayton et al. (1992); and of Tech Prep, see Dornsife (1991).

[14]In 1989, agricultural jobs hit the lowest point in their 60-year decline, encompassing only an estimated 2 percent of the U.S. labor force (Moss, 1989). Over 50 percent of U.S. farmland in 1983 was owned by non-farmers (Schumacher and Kahler, 1989). The majority of youth who enter agricultural careers today will work in large, specialized, corporately owned agricultural facilities in production support positions; in the past, they worked on family-owned farms.

experience with agricultural education has been almost ignored in the current discussion of education reform in general, and of school-to-work programs in particular. The publicly supported, integrated system of agricultural education, extension, and research is acknowledged to be one of the enduring U.S. economic success stories of the last century. Anxiety about the nation's declining economic prowess has never penetrated the agricultural sector. U.S. agriculture has tremendous natural advantages; nevertheless, the system of research, technological diffusion, and education has been essential for creating the world's predominant agricultural power. Many graduates of agricultural education programs who have gone on to other fields have remained enthusiastic supporters of the "ag ed" system.

But despite these positive impressions, most researchers and policymakers involved with education reform have only vague notions about agricultural education. This is an unfortunate oversight because there are potentially many lessons in the ag ed system for broader education reform.

The auxiliary agricultural education programs such as 4-H and Future Farmers of America (FFA) are important elements of the system. Sponsored by the Cooperative Extension Service of the U.S. Department of Agriculture and state land-grant universities, 4-H is one of the oldest efforts in organized vocational education in this country and is still educating large numbers of young Americans. In 1986, more than 4.5 million young people between the ages of 9 and 19 in the United States were involved in 4-H programs (Gore, 1988). There were 130,000 4-H participants in Iowa alone in 1987 (Gore, 1988). The 4-H program of Purdue University's Cooperative Extension Service is Indiana's largest nonformal education program, with 160,000 members (Stitsworth, 1987).

Agricultural education continues to have strong advocates who argue that it makes an important contribution, and there have been some attempts to evaluate agricultural vocational education programs. In some cases, these have been limited to more subjective elements of a program, such as its effects on social development and leadership (Etling, 1989; Rollins, 1989a, 1989b; Ladewig, 1987a, 1987b). Evaluations involving past participants in 4-H and FFA have also attempted to assess participant attitudes and opinions (Matulis, 1984; Miller, 1987; Caplinger, 1984; Perkins and Braker, 1985). Most 4-H alumni are satisfied with their experience, stating that they would recommend the program to their children. Over 80 percent of the more than 700 members interviewed in Texas stated that 4-H met their needs, and over 60 percent of those interviewed who were not in 4-H indicated that they would have joined if a program had been available (Ladewig, 1987b). Although the evaluation studies of agricultural education vary widely in their methodological rigor, they do suggest that the particular blend of academic training, community participation in

Supervised Occupational Experiences (SOEs), and extracurricular activities that characterizes agricultural education and its auxiliary organizations such as 4-H and FFA has been effective in training youth for productive employment and leadership roles (Bobbitt, 1988; Caplinger, 1984; Cheek, 1979; Etling, 1989; Ladewig, 1987a, 1987b; Matulis, 1984).

As its name implies, agricultural education targets those students interested in obtaining the proper skills and knowledge to gain agricultural employment upon graduation. As the dynamics of the American farm and its surrounding community entered an era of high-tech, globalized operations, the academic component of agricultural education broadened, becoming applied and interdisciplinary, and covering everything from management to engineering. Students receive hands-on, practical work experience from local employers and community members, which builds on an applied academic education received in the classroom, often provided by teachers who have received formal training in agriculture. What differentiates agricultural education from most other forms of vocational education is the socialization that students receive into the world of work through voluntary extra-curricular activities, which have become almost as much a formalized part of agricultural education as the classroom. These activities include events and contests that give students the opportunity to practice their skills and demonstrate their knowledge to their peers and future employers. Almost all of the reports and evaluations of 4-H and FFA argue that these programs are particularly effective in teaching leadership and personal development skills (Gore, 1988).

Cooperative Education

Cooperative education ("co-op") got its start around the same time as agricultural education, in the early 1900s; it was considered one of the most innovative forms of industrial education. Its defining concept – providing adolescents with paid employment closely linked to the classroom – was developed in response to the demands of the expanding U.S. industial sector for properly trained and educated workers (Ringel, 1981). Indeed, the first high school co-op, established in 1908 in Fitchburg, Massachusetts, would perhaps be better classified as an apprenticeship program.

In the Fitchburg School, written contracts were drafted among parents, students, and manufacturers specifying a four-year commitment for all who participated. Students were to be prepared for "upwardly mobile and vocationally and economically successful" workforce participation (Ringel, 1981). The first year was exclusively dedicated to academic training in math, English, science, and drawing, and focused on the practical but did not neglect the intellectual side of academic performance. The following three years alternated weekly between shop and school.

Completion of the four-year program resulted in beginning journeyman status. Despite enthusiastic company participation (employer involvement doubled in the first five years that the school operated) and positive results among the school's graduates, the program was discontinued in 1928.

Today co-op education is less formal and standardized. High school co-op students usually spend the second half of their school day working in a job for which they not only get paid but also receive high school credits toward graduation. They spend the morning in academic classes recommended and approved by a school co-op coordinator whose responsibilities are to maintain contact with employers, students, parents, and academic teachers. Most co-op programs provide no workplace credentials for participation – the rewards are in early workplace exposure that will help lead to employment after graduation, wages received while in high school, and a high school diploma upon completion.

Some empirical evidence suggests that co-op education does contribute to clarification of career goals, self-confidence, awareness of interpersonal relations, and increased motivation (Kerka, 1989). But although general impressions about co-op education are almost always positive, the review of evaluation research by Stern et al. (1990) suggests that while "research does find that co-op students are relatively satisfied with school . . . there is no consistent evidence that they learn more, become more productive, or find better jobs." Stern and his associates argue that methodological problems with the evaluations may hide stronger positive effects. While these methodological problems have not been solved so far, preliminary results from a longitudinal study conducted by these authors confirm earlier findings that co-op jobs (or other school-supervised jobs) are of higher quality than term-time jobs that high school or college students find on their own (Stern et al., 1991).

Nationwide enrollment in co-ops does not appear to be growing to the extent that one would assume based on the generally positive program appraisals (U.S. Department of Labor, 1987, 1988a, 1988b; U.S. General Accounting Office, 1991). In 1988, the National Child Labor Committee of the Employment and Training Administration reported that 520,000 high school students enrolled in cooperative education programs during the 1979-80 school year. Unfortunately, this was the last school year of routine data collection on these programs by the U.S. Department of Education, and the U.S. Department of Labor has expressed questions regarding the data's overall accuracy (U.S. Department of Labor, 1988b). In an attempt to gather more recent and reliable data, the U.S. General Accounting Office (1991) administered a survey to state education directors around the country and determined that approximately 430,000 high school students were enrolled in cooperative education programs during the 1989-90 school year – only 8 percent of the nation's juniors and seniors and less than 4 percent of all high school students. Comparison of 1979 and 1989 data implies

a 20 percent decrease in the number of co-op students over the 10-year period. The meager proportion of all students enrolled in such programs in 1989 seems to indicate that co-op has not "caught on" among students in the way educators and researchers had hoped.

High School Career Academies

The academy concept originated at the Thomas Edison High School in Philadelphia in 1969 as a program specifically for youth at risk of dropping out of school. As a result of encouraging improvements in dropout rates in the first academies, the model was widely adopted within the school district; by 1992, 24 academies had been created in 16 comprehensive high schools. In the early 1980s, the academy model was replicated in several California locations, Pittsburgh, and Portland (Oregon) in response to rising concern regarding the dropout rate and the skills of the future workforce. California, which now has more than 50 academies, institutionalized the model through state legislation that authorized funding to help defray start-up expenses and incremental costs associated with the programs. The National Academy Foundation, a nonprofit organization that actively promotes a variation of the academy model with a prescribed curriculum, has more than 100 programs in its national network, and programs modeled after the Philadelphia and California academies have been implemented in a number of other locations.

Stern (1990) identifies three basic characteristics of the academy model. First, each academy is organized as a "school within a school." This approach was initially designed to provide additional, more personal academic and vocational instruction for at-risk students as a vehicle to keep them in high school. Advocates maintain that these small learning communities help to foster strong, long-term relationships between students and teachers and create a supportive peer culture among students that reinforces aspiration and achievement (Dayton et al., 1992). Second, each academy has a particular vocational, occupational, or industrial theme such as electronics, health, or business and financial careers. By providing a highly structured, occupationally oriented program blending applied academics, workplace exposure, career counseling, and vocational courses, academies hope to capture the educational interest of students. Similar approaches have been supported by research in the cognitive sciences, which suggests that students learn more effectively when they have opportunities to use concepts and competencies in a functional context (Raizen, 1989). Third, local employers in the relevant economic sector are involved in the academies. Employers donate time as advisers and mentors as well as equipment and other resources. They also provide job placements and internships for academy students and graduates.

Students have opportunities to gain work experience in fields related to the academy's occupational theme. Those who meet specified academic or attendance standards can obtain co-op-like job placements during the summer before senior year and/or after school during their senior year. Individualized educational and occupational goals for each student (not formal credentials) are established by educators in conjunction with employer recommendations.

Evaluations of the California academies suggest that dropout rates are lower for academy students than for a matched comparison group of non-academy students. Longitudinal follow-up surveys of the California students found similar patterns of employment and post-secondary schooling among academy and non-academy graduates (Dayton, Weisberg, and Stern, 1989). While inconclusive, the latter finding may be the result of the academies' ability to keep potential dropouts in school.[15]

Tech Prep

The central concept of Technical Preparation programs, widely known as 2+2 or Tech Prep programs, is the articulation of secondary school with community college programs in specific occupational areas. Although the articulation concept dates from the late 1960s, the 1990 amendments to the Carl Perkins Act allocated funds to encourage the approach. As defined by the amendments, Tech Prep involves the coordination of curricula during the last two years of high school and two years of community college "with a common core of required proficiency in mathematics, science, communications, and technologies designed to lead to an associate degree or certificate in a specific career field" (Section 344). Coordination and consultation with local employers and labor unions are also a key component of the model as it is outlined by the federal legislation.

Throughout the more than two decades of experience with articulation, program designers have emphasized the "cluster approach" to occupational programs. Rather than training students for a specific occupation, schools provide broader preparation for a cluster of related occupations (Parnell, 1984).

The Tech Prep strategy lends itself to the inclusion of a work component, although this

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[15]The post-secondary employment and schooling effects may be biased downward for academy graduates if the academies succeed in retaining students who would otherwise not finish high school. The presence of such students in the academy sample (but not in the non-academy sample) would lower the measured effects of the academies.

component is not widely institutionalized at this point.[16] In some cases, students work 10 to 15 hours a week while in high school and 10 to 20 hours a week during post-secondary schooling. Additionally, some programs provide for full-time employment during summers. Employers contribute both by providing job placements and by serving as advisers for the design and implementation of the school programs.

The program's impetus comes from the belief that narrowing the gap between high school and post-secondary training will increase the possibility of students' continued education (Dornsife, 1991). Most Tech Prep advocates believe that many students do not continue their education because they do not have the funds or the tenacity to "start all over again" in college after completion of high school. Through Tech Prep's deliberate integration of high school and community college curricula, these students will already have gained advanced status before graduating from high school. Such integration also minimizes the repetitiveness of coursework. The workplace has a nurturing role in Tech Prep, giving students experience in the adult world of responsible work and providing incentives for them to continue their schooling. Student progress is marked by achieving certain certifications/credentials along the way (Parnell, 1984). Credentials and certification requirements are mostly determined at the local level at this point, although some are determined statewide (Dornsife, 1991).

Michigan has one of the more ambitious Tech Prep initiatives. The state is promoting the use of Carl Perkins Act Title III funds to develop a new concept of vocational education called Career and Technical Education, with the explicit goal of eventually serving a large percentage of the student population. The "Tech Ed" core curriculum is broken down into three components: Physical Information (manufacturing), Information Systems (business), and Bio-Related Systems (health). This curriculum provides not only traditional academic instruction but also employability skills training and career preparation. Michigan has devised a five-stage program development process that will result in a total revision of the traditional high school and middle school curricula. The first stage is the "beefing up" of vocational education with academics. Subsequent stages include the integration of

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[16]Some Tech Prep programs, such as the one developed in the Pickens County School District in South Carolina, are actually using the youth apprenticeship model as established by Jobs for the Future to direct their vocational education efforts. Most Tech Prep programs, including that established by the Delaware Consortium on Technical Preparation Programs, include applied coursework in the high school portion of the program, but rely on their community college partners to supply the work exposure through either work simulations or job placements.

applied educational courses into traditional academic courses. The state has only just begun this development process.[17]

By mid-1990, there were more than 120 Tech Prep programs in 33 states (Delaware Consortium on Technical Preparation Programs, 1991). Tech Prep has had an impact on the thinking of educators about the activities and communication necessary on the part of the educational community to keep students in school. Dornsife (1991) cites three nationwide evaluations that have been carried out to determine the degree to which states have fully adopted the Tech Prep articulation approach between high schools and community colleges. All three concluded that most articulation programs appear to be designed simply to eliminate course duplication through joint programming, and that they are keeping the overt organizational division between high schools and post-secondary institutions largely intact (Long et al., 1986; McKinney et al., 1988; Weber, 1988).

Systematic impact evaluations of Tech Prep have not been carried out, but many reports from the field suggest positive results. For example, in the six years since the start of the North Carolina Tech·Prep Programs, in the Tech Prep sites, SAT scores have risen, dropout rates have fallen, and there has been a 60 percent increase in the number of students taking high school algebra. Community college enrollment among Tech Prep participants has risen 28 percent. Based on these findings, North Carolina plans to replicate the program throughout the state by 1995 (Scott, 1991; North Carolina State Department of Community Colleges, 1990).

At this time, Tech Prep programs enjoy a positive image. Moreover, the added encouragement and national attention provided by the Carl Perkins Act amendments will certainly result in further growth and development of the model.

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[17]Information gathered from authors' conversations with employees at the Michigan Board of Education.

III. STUDENT PARTICIPATION

Reformers must address an important set of questions in determining who will participate in youth apprenticeship programs. Can a program be developed that creates a single educational environment appropriate for all students, regardless of whether their future goals lead them to post-secondary education or directly into the labor market? Can such a system avoid "creaming" only the best students? Can it provide opportunities for at-risk youth and, if so, can it avoid the stereotyping that often accompanies programs for the disadvantaged, those at risk of dropping out, or the non-college-bound?

We know that apprenticeship can work, and work well, in the United States for some occupations and population groups. Most analysts agree that the apprenticeship system for training construction workers produces high-quality craft workers, but it provides training for a relatively small number of workers whose average age is 29 and who are headed for very specific occupations in an industry with special labor market institutions.

Current advocates of youth apprenticeship envision a much broader system that can encompass at least the non-college-bound, although this group is not well defined. While many young people may not plan to go to college immediately, they want to at least hold on to the possibility. It is probably out of the question politically and practically to base a major education reform on explicit tracking of adolescents to a non-college career path. Significantly, apprenticeship advocates point out that increasingly in Germany, apprenticeships can lead to occupational and educational levels that, in effect, were previously closed to those who had been through the apprenticeship system.

As our discussion of contemporary educational strategies will show, vocationally oriented programs in the United States have had limited success in securing the participation of *all* students who are appropriate for a school-to-work initiative. Most programs still enroll occupationally oriented and at-risk students – keeping the dichotomy between vocational and academic students largely intact. Some programs that are attempting to break away from the vocational-academic differentiation appear to be increasing their standards for admission to the point where creaming is a danger. However, there are grounds for some optimism.

Among current school-to-work models, **Tech Prep** programs appear to have come closest to breaking the barriers in secondary education between traditional vocational and academic students. Indeed, the basic goal of the Tech Prep strategy is to create a stronger institutional link between the

secondary and post-secondary institutions, thus beginning to blur the distinction between the college-bound and non-college-bound.

Tech Prep programs can be considered a step forward in that they do increase the post-secondary education opportunities for a broader group of students. Of course, this approach does preserve the distinction between students headed for community colleges and those bound for four-year degrees. Indeed, questions about the tracking inherent in the community college system have been debated among educators for decades (Dougherty, 1987). Certainly the very low community college graduation rates should discourage excessive enthusiasm about the system. Nonetheless, Tech Prep is an improvement over traditional vocational education. The model has gained increased support and funding because of its technological emphasis – the Carl Perkins Act of 1991 reauthorized $63 million specifically for Tech Prep. Business, education (at both the secondary and community college levels), and government leaders over the past five to ten years have advanced the program as a way to steer more students into higher education (although to the authors' knowledge this has not been demonstrated empirically). By the late 1980s, more than 33 states reported the establishment of Tech Prep programs, and by 1987 Tech Prep had been embraced by Delaware, Hawaii, Indiana, Oregon, and Rhode Island on a statewide level (Tri-County Technical College, 1990).

Regardless of the support for the program, there is still student differentiation. Ohio, a state with many Tech Prep advocates, began a new education agenda in the fall of 1987 whereby all students at the district high schools were placed in one of three curricula tracks: college prep, Tech Prep, or vocational education. This approach preserves traditional educational differentiation and perhaps runs the risk of duplicating the problems of the old general education track. Ohio's Canton City Schools Tech Prep literature defined the type of student for whom its Tech Prep programs are intended:

> Someone who isn't interested in a four-year degree because they know they don't want to be a doctor, lawyer, or teacher but, at the same time, realizes that vo-ed may offer initial employment opportunities but is very limited in advancement. (Canton City School District, 1990)

Although this statement overtly accepts educational tracking, Tech Prep advocates argue that such a division is not necessarily negative if students make an explicit choice based on full knowledge of their options and the implications of those options. Many Tech Prep programs claim to target at-risk youth, but high school programs such as those working with the North Carolina community college system are geared toward "students with an aptitude or interest in pursuing advanced technical

training" (Scott, 1991) – that is, they are average-performing high school students who presumably have chosen not to attend college, instead pursuing technical/vocational training after high school graduation. Indeed, the programs appear to some extent to be creaming – that is, they are geared more toward students who have shown some evidence of academic preparation and success prior to their junior year in high school. Many schools throughout the country have set standards for admission into Tech Prep programs in addition to specifying that certain courses, such as algebra, be completed before entering the program in the 11th grade.

For an even earlier start, motivated students often enter pre-Tech Prep programs in the 9th grade. For example, in Delaware, which has initiated a statewide consortium aimed at developing programs to smooth students' transition to work and post-secondary education, Tech Prep programs begin their instruction with 9th-graders, who enter technical centers full-time. At these centers, coursework emphasizes basic skills development and technical/advanced math achievement.

Despite widespread enthusiasm, Tech Prep is in its infancy in most states. Seven high schools in Delaware have contractual agreements with community colleges which encompass 14 different courses of study, but only just over 1,000 students were registered to participate during the 1991-92 school year (Delaware Consortium on Technical Preparation Programs, 1991). With Tech Prep advocacy similar to that in Delaware, the Boston-based project Protech, a work-based youth apprenticeship program in the allied health professions, began in September 1991. It initially targeted 25 11th-graders, although the student body is expected to grow in the future (McDonagh, 1988). North Carolina initiated a Tech Prep program in 1986 that has expanded to include 11 school systems, with 39 awaiting additional funding in order to begin (North Carolina State Department of Community Colleges, 1990). Although this growth among the state's school districts is encouraging, actual enrollments have not been made public (Scott, 1991). Ambitious plans in Michigan are still at a very early implementation stage.

Agricultural education has also had some success in reaching a broad student body, at least within the agricultural community. Agricultural education's target population has changed as the U.S. farm economy has evolved. The family-owned farm has given way to large, specialized, high-tech, corporate farming operations, and youth are more likely to end up in production support positions than as owner/operators. This factor alone has put an increased burden on agricultural vocational programs, forcing many of them to solicit nontraditional students and provide programs where the agricultural (vocational) component is often peripheral to the academic component.

For example, in a survey of 59 vocational agricultural education teachers in Arkansas in 1985, only an average of 32 percent of their students were living on farms (Perkins and Braker, 1985). In

California, agricultural education enrollments actually increased by 6 percent in 1988-89, but, surprisingly, only 15 percent of those enrolled in the state's agricultural education courses reported living on farms or ranches, illustrating the program's expanding target population (Popkes, 1989).

The characteristics of 4-H participants have also changed. Although the program had its roots in rural and agricultural education, it no longer targets rural farm youth exclusively. More than one in five of the nation's 4-H members live in cities of more than 50,000 people (Gore, 1988). These students appear to be less interested in the agricultural experience that 4-H can supply and more interested in the leadership activities and peer associations available through agricultural education's extracurricular activities. Some local 4-H programs are beginning to provide foreign exchange programs for their students – another way to expand the target population beyond the traditional vocational education student who is solely interested in rural farming (Stitsworth, 1987). Although the program's most useful components center around traditional vocational activities such as work-related projects, contact with other members of the organization, and industry competitions, these activities are now often emphasized within the organization as ways to strengthen leadership abilities and individual work styles.

Perhaps because it is focused on a broad industry rather than an occupation, 4-H and similar agricultural programs appear to have been able to serve a wide, indeed a widening, clientele. While such programs have helped to educate people now employed on corporate farms and in agricultural support industries, they also appear prominently on the resumes of U.S. congressmen and senators. Of course, it is possible that the history and culture of the agricultural economy and society provide a basis for 4-H and similar programs that cannot be replicated by other types of school-to-work initiatives. The family farm provided an unusual environment for an educational program, not because it integrated school and work but because it integrated home and work. But the fact that 4-H and similar programs have evolved beyond the family farm and now successfully serve a more diverse group of participants provides some reason for optimism about the possibilities for youth apprenticeship.

Whereas there is no typical target population for **cooperative education**, a recent study by the U.S. General Accounting Office (GAO) (1991) that examined co-op students nationwide determined that participant characteristics varied with the perceived quality of the program. Programs that were viewed as being of higher quality had higher admission standards and participation rates, whereas those programs that carried the negative stereotype of vocational programs had fewer applicants and were therefore less selective. Most programs, however, have admission standards that require co-op students to have an average GPA (at least 2.0 in most programs), good attendance, a positive

attitude, and a lack of disciplinary problems, in addition to meeting any specific employer requirements to assure less difficulty with job placements. These requirements implicitly screen out disadvantaged youth.

The GAO report described the nation's 1989 co-op participants using demographic characteristics as well as test scores to create an overall picture of the student population. A survey of state vocational education directors revealed that 76 percent of all co-op students were white and 48 percent were male. They tended to have lower than average test scores and to come from lower socioeconomic levels (59 percent of all co-op students were in the bottom two socioeconomic status [SES] quartiles and 60 percent were in the bottom two quartiles in composite test scores). Only 24 percent of seniors participating in co-op programs nationwide were in a vocational track in high school in which college and general education students also participated (U.S. General Accounting Office, 1991).

Co-op students tend to be in typical vocational education occupational areas – marketing/distributive (predominantly retail sales), trade and industry (auto mechanics and auto body work, carpentry, and construction), and business. In 1989-90, 37 percent of co-op students were in marketing/distributive, 20 percent in trade and industry, and 17 percent in business occupations (U.S. General Accounting Office, 1991).

But while high school co-op seems closely linked to vocational education programs, there is a strong tradition of co-op-like education at four-year colleges. For example, many engineering students at four-year universities participate in co-op programs. Additionally, many professional schools such as law and medicine require some type of co-op training – often referred to as internships, clerkships, etc. – before certification can be achieved. Indeed, research has indicated that secondary school co-op programs can attract high school students not traditionally enrolled in vocational education programs into apprentice-type work in order to gain marketability and workplace skills (U.S. General Accounting Office, 1991).

The acceptance of the co-op approach for advanced professional training is evidence that an apprenticeship-like strategy might have appeal beyond students traditionally attracted to vocational education. On the other hand, the varied quality of co-op programs suggests that tracking or other forms of student differentiation can emerge within co-op education itself.

The **career academy** movement has never overtly classified its students as either vocational or academic. The model initially targeted students who were considered to be at risk of dropping out of school. Many feel that potential academy students are similar to the Tech Prep target population in that they have the ability to learn and excel but are usually confined to general education tracks

where they have few incentives to perform well. However, student segregation is a natural outgrowth of the academy school-within-a-school approach, since academy students are separated from their peers in both their applied academic and vocational courses.

The California Partnership Academies use the school-within-a-school structure to provide extra attention to at-risk students, thereby giving them the chance to excel beyond what they may have otherwise achieved (Raby, 1990). When two schools in the state's Sequoia Union High School District began academies, they initially accepted 10th-graders with low grade point averages who were behind in credit accumulation, had histories of poor attendance, showed a disinterest in regular academic programs, and had low socioeconomic status. These academies sought to break the negative stigma attached to other interventions targeting at-risk youth by involving students in a program featuring high-quality integration of academic and vocational subject matter.

The Philadelphia High School Academies (the model for California's academies) were developed by the Philadelphia Urban Coalition. They were designed to serve students who would not normally qualify for vocational programs due to low academic skills, lack of motivation, or lack of particular career interests. In these academies, the vocational aspects of the program were used to entice students who were generally not interested in a strictly academic course of study yet could read at least at a 5th-grade level and had expressed interest in a vocational area represented by one of the academies. The original Philadelphia academies targeted disadvantaged students, and the program remains committed to serving students who are at risk. However, the target population seems to have expanded to include students who regularly attended junior high school classes but are considered to be underachievers by measures such as grade point average (Holmes and Collins, 1988; Neubauer, 1986). In addition, the mission of the academies has broadened: they now seek to prepare students for college as well as full-time employment, or some combination of the two. As the focus has shifted, the proportion of minorities in the academy student body has fallen from 95 percent in 1986 to 77 percent in 1990 (Neubauer, 1986; Philadelphia High School Academies, 1991).

Some districts have explicitly sought ways to extend the academy programs to high- and average-achieving students as well; they have created selective academies and programs that mix students with a range of achievement levels. In the early 1980s, Philadelphia started a health academy specifically designed to prepare students for post-secondary education rather than work. In this case, a vocational orientation is used to strengthen the education of college-bound students. The academy's director stated that "the other Academies infused a vocational training program with academics. In the Health Academy, we infused an academic curriculum with a vocational orientation" (cited in Stern, 1990). The Southern California Space Academy in Pasadena and the Pre-Engineering

Academy in Oakland are similarly geared toward college-bound students, but academies that target only these students are uncommon.

Other academies require that the enrollment include only *some* at-risk students, as defined by attendance, grade level achievement, behavior, and advancement toward completion of high school. These programs tend to admit students who are perhaps relatively less at risk and likely to graduate in the absence of the program. For example, the director of the Pasadena academy stated that "the program is open to all students . . . [but] at least 50 percent of the students in the program *have* to be considered at risk."[18]

Despite the generally positive impression of the California academy programs, they still serve only a small percentage of the state's students. Academy enrollment as a percentage of total school enrollment is relatively low. Indeed, even in Sequoia High School – the site of the first academy in the state, which was the model for all other California programs as well as the state legislation – only 7.3 percent of the students are enrolled (Raby, 1990). Pasadena Partnership Academies, which began in 1989, have only 120 students to date. The Philadelphia High School Academies, started in 1969, enrolled 1,430 students in 1986, only about 5 percent of the city's high school students (Holmes and Collins, 1988; Neubauer, 1986). While the number of enrolled students had nearly doubled by September 1991 (Philadelphia High School Academies, 1991), the model still served a fraction of those in the district who could potentially benefit. Recognizing this, several of the city's large high schools now offer two academies. This approach, which has been adopted in other districts such as Oakland and Pasadena in California, allows the schools to reach a larger proportion of the appropriate and eligible students.

Several well-regarded hybrid academy programs have been started across the United States – especially by corporations. These programs, as a general rule, employ more stringent admission requirements for participating students, albeit in very subtle ways. For example, some programs start in the 11th grade, after many students have dropped out, or accept only applicants who have demonstrated good attendance. Programs such as the National Academy Foundation's academies, which focus on finance, public service, or travel and tourism, are sponsored by large corporations and geared more toward "future employees" – a definition that suggests that students with many academic problems will be excluded. The Foundation's programs, which are supported by more than 100 corporations across the nation, enrolled just over 4,000 students in 74 schools in the 1991-92 school

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[18]Authors' telephone interview with the Superintendent of Vocational Education, Pasadena School District.

year (National Academy Foundation, 1991). While these programs can be found in 34 major cities, their aggregate impact is minimal within any one district.

Whereas academy programs originally targeted youth who lacked academic and occupational focus, newer academies have been established that target a more diverse group of students; a limited number even target college-bound students. In addition, successful academies attract more applicants, increasing competition for placement in the program and, in some cases, resulting in pressure to raise admission standards. Nevertheless, most academies still target students who have not excelled in a conventional school environment and who are unlikely to have plans to attend a four-year college when they enter the program.

Conclusion

The experience with school-to-work programs in the United States is grounds for some optimism about the potential of youth apprenticeship to serve a broad range of students. There are many examples of programs that have expanded their enrollments beyond at-risk youth or traditional vocational education students, but two tendencies appear to emerge. First, programs that do serve a wide variety of students tend to become internally differentiated, perpetuating the division between types of students. Second, academically oriented students preparing for college are only tenuously involved. The Philadelphia Health Academy, which was explicitly designed to prepare students for college, has had few replications. And when programs do reach out for college-bound students, less academically oriented students tend to be excluded. Agricultural programs are interesting in that they appear to have been able to include many top students without severely limiting their enrollment of less successful students.

IV. EDUCATIONAL CONTENT

Contemporary thinking on education suggests that there are significant advantages to a pedagogic approach that combines practical applications with a theoretical or academic foundation.[19] One of the most important reasons for the growing interest in youth apprenticeship is its potential for integrating academic and vocational education.

There has already been a great deal of research generally concluding that there are important benefits to this type of learning (Grubb, 1991b; Grubb and Stasz, 1991). Many relevant pilot projects have been launched during recent years and the 1990 amendments to the Carl Perkins Act have provided further incentives to pursue it. Although the results of efforts to date appear positive, serious implementation problems remain. Combining academic and vocational education is currently put into practice as a reform of vocational education rather than as a basis for broader education reform.

While academic/vocational integration is one potential advantage of the youth apprenticeship model, advocates argue that the model also strengthens behavioral and social skills. In the United States, many adolescents have little prolonged contact with adults. Although many work, their coworkers are predominantly other youth. By placing students in workplaces with competent adults, apprenticeship promotes mature behavior. This point is made by Hamilton (1990), who contrasts the responsible behavior of teenage German apprentices to the stereotypical irresponsibility of American youth.

In this section, we will examine the extent to which school-to-work transition programs in the United States have been successful in integrating academic and vocational learning, and in encouraging personal/social and professional development.

The **Tech Prep** and **academy** models explicitly try to combine academic and vocational instruction. Programs are organized around particular occupations or industrial sectors that are judged to have a strong demand for trained entry-level workers and to offer the most promising future careers. Health/health care, electronic/electrical, computer, general business, and automotive and mechanical preparation programs are among the most common nationwide.

Both models balance applied academic courses and actual or simulated workplace experiences to provide students with a combination of academic and vocational skills needed in both future jobs and educational pursuits. The vocational component is designed to turn the workplace into an

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[19]See, for example, Resnick (1987a, 1987b) and Raizen (1989).

instructional tool by using simulated work-specific examples in addition to actual workplace experiences to teach and reinforce theory and skills learned in the classroom. Applied coursework is a prominent feature of both Tech Prep and the academies, and many believe that this pedagogical approach has the potential to provide a theoretical and conceptual framework for those who are less inclined to learn by traditional methods in which theories and concepts are taught. This approach builds on the cognitive science research that suggests that students learn more effectively if the barriers and distinctions between in-school learning and out-of-school activities are broken down (Resnick, 1987a, 1987b; Raizen, 1989; Sticht, 1989; Berryman and Bailey, 1992).

The school-within-a-school format of academies allows students to take a block of applied academic courses with peers who share their occupational interests. These applied academic courses are supplemented by vocational courses and summer/afternoon employment. In addition to employment opportunities, the curriculum includes occupationally oriented field trips, worksite tours, mentors, achievement awards, and other activities. Career development programs and counseling services are also vital ingredients of academy programs.

Today's Tech Prep programs also use academic courses to provide a theoretical or conceptual basis for the educational experiences of the traditional vocational student. Advocates suggest that Tech Prep participants are not only provided with the skills for technical employment upon graduation, but also with a solid academic education. These supporters argue that the Tech Prep track is not meant to prohibit students from obtaining a traditional four-year college degree if they choose to do so.

The majority of Tech Prep programs operate on a "2+2" basis: two years in high school and two at a community college. Students begin the program in the 11th grade and complete it upon earning an associate's degree.[20] Two years of core courses in math, science, communications, and computers begin in the 11th grade (Parnell, 1984). In most programs, attempts have been made to coordinate and articulate the high school and community college curricula in an effort to eliminate any duplicated coursework, thus shortening the time required for Tech Prep participants to complete a post-secondary program concentrated in a trade or occupation. Articulation also facilitates a more

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[20]Although the majority of the demonstration programs currently funded under the Carl Perkins Act follow the 2+2 model involving high school and community college work, as early as 1975, states such as Michigan developed their unique variation of "2+2." Although Michigan now follows the typical 2+2 model, it once linked two-year community colleges to the last two years of baccalaureate education. Pioneering states such as North Carolina began 4+2 programs (beginning in the 9th grade) as early as 1986 without Perkins funds.

efficient linkage of preparatory work in high school to more focused occupation-specific work in the community college – in effect, an attempt at a sequential integration of academic and occupational instruction.

The curricula for applied academic courses in Tech Prep and academy programs are similar. In most academies, the academic curriculum centers around English, math, and social studies courses, which are offered both semesters of the sophomore and junior years in a "block roster" scheduling format. In this format, academy students take their core academic requirements together with the same teachers throughout their three years in high school, often in the morning. During the remainder of the day, they usually take one vocational course per semester that is related to their chosen field. The other courses, usually two, are in such areas as the fine arts and foreign languages, chosen by the student. These elective courses are taken with non-academy student peers.

Academic course content in Tech Prep programs can also be quite diverse, although "all schools acknowledge the importance of including appropriate academic courses – math, science, and English" – in their curriculum (Dornsife, 1991). Indeed, the high school portion of most current Tech Prep programs is often quite similar to college prep programs in that each prepare students for advanced post-secondary instruction, albeit in different types of institutions.

Some schools still strongly recommend that students in Tech Prep programs enroll in a selection of routinely offered academic courses such as English and physics, but others, as in Canton, Ohio, are moving toward offering a series of high-level applied "tech" courses (including Tech Math, Tech Chemistry, Tech Physics, and 20th-Century Literature and Composition) that are designed to include vocational content while maintaining a high level of academic instruction (Canton City School District, 1990). These courses emphasize the acquisition of academic principles and concepts through classroom and laboratory activities that connect abstract knowledge to workplace applications.

Under the provisions of the 1990 amendments to the Carl Perkins Act, states can establish their own blend of academic and occupational instruction for Tech Prep. The language of the legislation makes clear the goal of coordinating a broad academic foundation with more specific occupational instruction through both classroom and practical experience. Section 344 of the amendments sets forth requirements for Tech Prep programs:

> An articulation agreement between the participants in the consortium . . . 2 years of secondary school preceding graduation and 2 years of higher education, or an apprenticeship program of at least 2 years following secondary instruction, with a *common core of required proficiency in mathematics, science, communications, and technologies* designed to lead to an associated degree or certificate in a specific career field.

Additionally, Section 347 requires that Tech Prep educational programs provide

> technical preparation in at least 1 field of engineering technology, applied science, mechanical, industrial, or practical art or trade, or agriculture, health, or business . . . [which] leads to placement in employment.

Occupational clustering is another strategy emphasized in both academies and Tech Prep. Rather than focusing on training for a specific occupation, these schools try to provide broader preparation for a related cluster of occupations. Tech Prep advocate Dale Parnell (1984) calls for a cluster approach whereby students learn a broad range of transferable occupational skills and are not "pigeonholed" as a result of narrowly defined job preparation:

> The high school portion of the career program will be intentionally preparatory in nature. Built around career clusters and technical systems study, such a Tech Prep approach will help students develop broad-based competence in a career field and avoid the pitfalls of more short-term and narrowly delineated job training.

Similarly, the Perkins amendments encourage instruction in "all aspects of an industry," not only to open up broader opportunities, but also because many analysts believe that workers can be more effective if they have a strong understanding of the context in which they are working. This pedagogical thrust is closely related to the notion that specific skills can be used most effectively if they are embedded in a deeper conceptual understanding – in other words, if education involves an integration of academic and vocational education.

Throughout the occupational component of academy and Tech Prep programs, regardless of the industry, stress is placed on a variety of auxiliary career and job-finding skills, including job-readiness, career planning, company research, resume preparation, and interview techniques appropriate to each field. In some cases, these programs have initiated career planning and discussion components for high school freshmen and sophomores (and sometimes even junior high schoolers) to increase their awareness of the options and opportunities that are available.

Although academies and Tech Prep emphasize various types of work-related activities, they remain primarily classroom-based. As a result, the links between the theoretical and practical are forged in the classroom; actual workplace experience is a supplement. In contrast, **co-op education** is a school-to-work initiative that takes place primarily on the job and whose primary pedagogic benefit comes from the experience and learning that students acquire there. Although some states require some form of instruction "related" to the jobs, for the most part, co-op students attend traditional academic and vocational classes with non-co-op students.

Consequently, the integration of the academic studies and practical experience depends primarily on the co-op counselor. These counselors have the responsibility of giving individualized assistance in coordinating students' academic schedules with their chosen occupational interest and of handling the job performance feedback received from students' employers. Typically, the teacher/coordinator, the work supervisor, and the student together prepare an individualized plan setting forth the objectives, nature, and scope of the expected learning experiences; how they are related; and whether the experiences are to take place in the classroom or on the job. In addition, the coordinator is given the responsibility of maintaining contact with the student's employer, including visiting the cooperating business to "confer with the student-worker and the supervisor to coordinate in-school and on-the-job activities for achieving the objectives in the training plan." The key role played by the counselors in integrating the two components of co-op education has been described as follows: "The classroom and the workstation . . . are not viewed as separate entities . . . the teacher integrates them into a total learning experience" (U.S. Department of Labor, 1989).

Unfortunately, reality frequently falls short of the ambitious goals set forth for the teacher/coordinator: coordinator responsibilities are often added to teaching duties, and a high school co-op sponsor is typically responsible for the general recruitment of students into the program and the supervision of 50 to 60 students' classroom and worksite instruction. Additionally, the designated co-op teacher/coordinator usually serves as liaison between the school and participating employers and recruits new employer participants (U.S. General Accounting Office, 1991).

Thus, the actual integration of co-op students' school and worksite learning varies widely and is often haphazard. Indeed, the benefits of the co-op experience are generally seen to lie in strengthened work habits and in greater maturity and employability, rather than in supporting academic learning. For example, the Employment and Training Administration alludes to the significance of the co-op workplace experience when it states that the most noteworthy trait of current co-op education is the "documented employability" its students attain. A vital outcome of program participation is a "recommendation from a reputable employer attesting to appropriate job behavior and skills" (U.S. Department of Labor, 1988b). The importance of the workplace experience has also been discussed by the U.S. General Accounting Office (1991), which notes that high-quality co-ops provide youth with structured socialization into the world of work and with job training ending in initial job skill mastery.

As a result of radical changes in the agriculture industry in the past 20 to 30 years, **agricultural education** courses have shifted toward more academic content. With agriculture's increasing use of high-tech mechanization and sophisticated chemicals, students are now required to

take subjects such as physics, engineering, and chemistry (Rosenfeld, 1983). Similarly, the movement of the agricultural industry from the family farm to corporate operations has resulted in a greater emphasis on subjects such as business management and finance. But regardless of the changes in specific courses, many of the learning techniques employed 30 and 40 years ago in agricultural vocational education remain largely intact. Vocational students in agriculture in the 1950s did as many projects, entered as many competitions, and spent as much of their time participating in "real-world" activities as they do today. Although there has not necessarily been an emphasis on the most academic subjects, it appears that the integration of coursework and practical learning experiences has always been strong in agricultural education.

Stuart Rosenfeld's 1983 article cites seven long-lived contributions of agricultural vocational education in the United States:

- leadership training;
- emphasis on a problem-solving approach (especially in math and science);
- less specialized curricula;
- strong ties to and support from the community;
- ability to maintain an adequate supply of dedicated and competent teachers;
- more student time required for extracurricular activities and occupational projects; and
- location in comprehensive high schools making accessibility to nonvocational courses and other activities easier.

These strengths suggest a broad emphasis on practical experience, combining classroom work with outside activities and projects, and a strong focus on behavioral and leadership skills.

Agricultural vocational education incorporates student organizations such as Future Farmers of America and 4-H as *integral* parts of the education process.[21] These student "clubs" are not merely after-school activities, however; they are such an essential part of agricultural education that a study of public schools in rural communities throughout the United States actually credited the majority of support for vocational agricultural programs to these groups (along with local agribusiness to a lesser degree) (McCracken and Miller, 1988; Bobbitt, 1988). In these organizations, students

[21]These programs have been replicated and adapted over the years to create clubs such as the Vocational Industrial Clubs of America (VICA) and Future Homemakers of America (FHA).

are taught leadership and technical skills in a holistic manner that reinforces management training, problem-solving skills, standard and goal setting, and achievement based on group and individual performance.

Unlike many "traditional" students, 4-H participants take an active role in the development of their educational activities. Many experts on the 4-H experience believe that its educational benefit is derived from the expectation that students will be tenacious and involved learners who set their own goals and academic pursuits based on their individual interests and ideas (Bobbitt, 1988; Etling, 1989; McKinney, 1987). Students are encouraged to use their own initiative and creativity to develop detailed projects dealing with some aspect of agriculture such as participating in a local livestock show or researching a new fertilizer and its effects on the local farming community. Additionally, a spirit of competition is promoted as members work toward displaying their projects at local and regional fairs where they vie for prizes and acknowledgment by their peers and adult role models. These fairs and agricultural exhibitions give 4-H members the opportunity to compete, demonstrate what they have learned, and teach others. A random sample of more than 700 former 4-H members in 1987 indicated that the development of life skills was the most important impact of the club on young people. Many of those interviewed emphasized how 4-H had helped them to develop basic competencies and coping and life skills needed to become a self-directed, productive, and contributing member of society (Ladewig, 1987a, 1987b).

Likewise, the many articles on and reviews of Future Farmers of America (FFA) have stressed the importance of the nontraditional educational activities to the occupational success of its participants (Binam, 1984; Womack, 1985). An Oklahoma study (Binam, 1984) indicated that participants believed that the after-school meetings, fundraising activities, and livestock exhibitions were the most important program activities. The vocational agricultural summer programs sponsored in part by FFA were also found to be vital in promoting the work ethic among students through all-day work activities (Womack, 1985).

In agricultural education, students learn problem-solving skills through real-world projects. The hands-on activities are designed to help students find solutions for themselves. In addition, the more general curricula of most programs enable students to go beyond purely technical capabilities to gain exposure to and an appreciation of political, economic, and communication skills. The students are also encouraged to explore both related and unrelated fields of study, which generally provide them with greater future occupational possibilities and marketable skills. During the course of most agricultural programs, students are required to set up and run their own businesses, a 100-year-old tradition known as Supervised Occupational Experience (SOE) (McCormick, 1988). This

requirement provides students with solid experience not only in their particular specialization but also in peripheral disciplines that are often as important.

The core academic courses of most agricultural education programs concentrate on agriculturally oriented subject matter in disciplines such as animal science, plant science, natural resources and aquaculture, and agricultural mechanics. But literature on exemplary programs shows that students participate in a wide variety of courses, including aerial photography and interpretation, mathematics for forest technicians, job-seeking skills, and business practices. Educational topics in 4-H now range from aerospace science to computers in business to the visual arts. The most popular projects, however, still focus on animals, food and nutrition, and home improvement (Cox, 1988).

Integrating broad academic and vocational skills is supported in the 1986 statement of goals for agricultural education of the California State Department of Education, including:

1. producing agriculturalists with broad frames of reference and skills necessary to move into any agricultural area,

2. providing a planned sequence of high school courses to include plant production, animal production, and agricultural business management with each course directly correlated to the science of which it is a part,

3. providing supervised occupational experience for students through outside career-related projects where students can either devise their own project or work in ag settings,

4. maintaining close coordination with the California Agriculture Teachers Association, and

5. maintaining FFA as an integral part of instruction by having the assistant state supervisor for ag ed act as advisor to FFA and regional staff members serve as advisors in their regions. (Popkes, 1989)

This strategy emphasizes both training for a cluster of occupations and instruction in all aspects of the industry. Agricultural education's focus on these approaches predates the more recent general interest in them evidenced by the 1990 Perkins amendments.

Conclusion

A good deal of progress has been made in working toward educational content that combines academic and practical learning. Programs have moved away from focused vocational training to developing instruction for broader occupational clusters or industrial sectors. Applied coursework is a primary feature of two of the four initiatives reviewed here – Tech Prep and the academies –

an approach, proponents argue, that is particularly good for students who are not academically oriented. The question of whether students who seem to perform well in an academic environment will also benefit from applied coursework is an issue that deserves attention as well, but is beyond the scope of this paper.

The academies and Tech Prep programs have supplemented their curricula with broadened work experience, but they have not achieved the type of coordination between on-the-job training and classroom learning found in German apprenticeship programs – the work components of these types of programs remain comparatively subordinate. Work experience is paramount in co-op education, yet coordination with the classroom is usually weak, dependent on counselors who must supervise large numbers of students and, in any case, cannot be expected to have a strong influence on what goes on in the classroom or at the worksite. Their role is more likely to involve trying to optimize a student's experience by helping the student choose among existing courses and worksites, rather than by helping to reform the educational experience that takes place either in the classroom or on the job.

Agricultural education appears to have been the most successful in providing a balanced education that combines theory and practical experience. It also seems particularly strong in developing behavioral and leadership skills. Unfortunately, few have sought to critically evaluate the strength and breadth of ag ed's academic component. It is also not clear how much the positive aspects of agricultural education result from the unique characteristics of the agricultural economy and culture, but continuing research on these programs as they work toward serving a population broader than their traditional clientele will begin to provide answers to this question.

The experience of these four types of school-to-work programs suggests that there remains a large potential for reforming educational content so that it integrates the theoretical and the practical. Many vocational educators in particular have become enthusiastic converts to the integration movement, and the incentives in the 1990 amendments to the Perkins Act will encourage further research, dissemination, and experimentation. But from the point of view of broad education reform, these efforts remain limited. Still conceptualized as a reform of vocational education, the integration strategy has barely penetrated traditional academic and college prep programs. Moreover, particularly relevant to the discussion of youth apprenticeship, the trend toward integration remains primarily in the classroom. Much less is known about how the workplace can be used most effectively in this strategy. In the next section, we discuss the potential for increasing the role of learning on the job.

V. LOCATION OF INSTRUCTION

The youth apprenticeship model attempts to merge the traditionally distinctive environments of the classroom and the workplace, employing formalized instruction in both. In apprenticeship, the worksite is more than a place to gain employment experience and learn about the world of work; it is a place where structured learning takes place. Employers (or their managers, supervisors, or skilled employees) are expected to be teachers. This partnership raises several issues. How can the workplace be used as a place of instruction? Can the traditional educational environment adapt to its new business partners? What will motivate employers to participate in this form of student instruction? How can the quality of employer instruction be assured for all students? And does workplace learning actually complement and enhance the learning that takes place in the classroom?

Employer Participation in Apprenticeship

In all types of apprenticeship, some formal, structured education leading to a recognized credential takes place on the job. Indeed, structured learning on the job is one of the most important defining characteristics of youth apprenticeship.

Why would employers participate? Certainly some will be willing to take on apprentices out of a sense of collective responsibility. This is probably the primary motivation for corporate participation in "adopt-a-school" programs, but it is not likely to sustain a mass effort.

Employers can also have a direct interest in participating. If they see individual apprentices as their future employees, training costs can be considered investments in the future of their own company. Similarly, they will be more prone to hire apprentices if the actual value of the trainees' contribution to the employer's operation minus any direct training costs is equal to or greater than the wage.

In the United States, however, there is a high rate of turnover among young workers, which might discourage employers from investing in apprenticeship, since they cannot count on young workers whom they have trained remaining at their company. There is research, though, that suggests that training appears to increase the expected tenure of employees (Mincer, 1988; Vaughan and Berryman, 1989). On the other hand, a large-scale apprenticeship program would have to involve many employers who may not have enough job openings to allow them to hire all of their graduating apprentices. This is the situation in Germany, especially among the small employers (Faist, 1992b). Moreover, insofar as reformers argue that an education based on apprenticeship can open up future

educational opportunities for the graduates, a successful apprenticeship program would also result in many students pursuing higher education instead of immediate employment upon program completion.

Reducing the cost of apprentices either through lower training wages or direct subsidies is another alternative. In the past, incentives for employers to hire young workers have not been effective. During the 1970s, the Youth Entitlement Demonstration guaranteed jobs for high school students who stayed in school. This was one of the few youth employment experiments that allowed fully subsidized work experience in both the public and private sectors. Despite the offer of a full subsidy, the take-up rate among private employers was relatively low. A special study within the demonstration using a sample of private employers in two demonstration areas found that employers were sensitive to the size of the wage subsidy. In one site, only 10 percent of all employers were willing to participate if they had to pay 25 percent of the wage, and at the other, only 5 percent were willing to participate if they had to pay 50 percent. The participation of private employers rose to 18 percent if the entire amount of the wage was subsidized. But although they were sensitive to the wage (the wage elasticity of demand was high), less than one-fifth of the private employers approached were willing to take on demonstration youth even at a zero wage (Ball et al., 1981). These findings probably underestimate the actual willingness of private employers to participate;[22] nevertheless, they are not encouraging. Apparently, employers believed that these young people would not contribute enough to justify the effort needed to supervise them. Perhaps for the same reason, cooperative education programs have remained marginal in relation to the overall education system, despite many positive views about their effects. It is a constant struggle to maintain the necessary number of high-quality placements.

Legislated training wages also run the risk of antagonizing older workers. An apprenticeship wage system is accepted in the construction industry partly because on many public-sector or public-sector-supported jobs, registered apprentices are the *only* workers who can be paid below the wage for fully skilled workers. The lower trainee wage is also an important incentive in Germany, but the German wage system is much more structured than the U.S. system. U.S. companies that want to employ teenagers at low wages can do so without resorting to special educational programs. German

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[22]Several conditions of the study are believed to have contributed to constraining the likelihood of private employer participation. In particular, the fact that community businesses that had already participated in the Youth Entitlement Demonstration were excluded from the experiment, and the short time frame for job development for the remaining employers, probably make the reported findings a conservative estimate of likely business participation.

employers are much more constrained in paying relatively low wages (as are U.S. construction firms under some circumstances). For this reason, the cheap-labor incentive for employer participation in apprenticeship is weak or absent in this country.

Current employer training practices for production workers provide further reason for pessimism. As many people have emphasized, employers rarely hire teenagers for so-called career-ladder jobs that require some training. Moreover, even older production workers receive little training. Most firm-based training in this country is still reserved for managerial, sales, and professional workers (Tan, 1989; Vaughan and Berryman, 1989).

There are currently several hundred thousand apprentices in the United States, and apprenticeship training, especially in construction, is effective. But the differences between the current system and the proposed model for youth apprenticeship make it difficult to make comparisons. Apprentices in the construction industry are usually in their twenties and are often high school graduates. Furthermore, the apprenticeship system is integrated into a much broader program of labor market regulation. Despite many attempts to develop open-shop apprenticeships, apprenticeships in construction remain primarily in the unionized sector.

The Workplace as a Learning Place

Education reformers believe that schools do not do a good job in preparing students for work. If this is true, then it makes sense to use the workplace for some of that preparation. But the purpose of youth apprenticeship would presumably be to provide broad portable skills as a part of a student's basic education. Are U.S. workplaces up to the task?

There is growing disillusionment with developments in the quality of work and learning on the job. For example, the influential report of the Commission on the Skills in the American Workforce (1990) argued that the vast majority of U.S. employers remain firmly committed to and apparently satisfied with traditional production processes that depend on low-wage, low-skilled workers. Even if such employers could be convinced to participate in an apprenticeship program, the quality of the education that apprentices would receive working for them is questionable.

Even if there is more change taking place in the country's offices and factories than the Commission perceived, many employers undoubtedly have continued to use traditional approaches to production in which learning and training do not permeate the everyday activities of employees. If apprenticeship were to be implemented on a large scale, these types of employers would inevitably be involved, and without major reforms, they would probably not provide adequate training. This

wide variance in pedagogical method and quality may therefore tend to reestablish the bifurcated system that has exacerbated the lack of opportunity for at-risk and disadvantaged individuals.

Almost no attention has been paid to how a learning experience on the job should be designed. One of the most widely accepted conclusions about the operation of employment and training programs in the United States is that programs that simply place young people on the job to gain work experience are not effective. Much more is required than exposing students to the workplace. Although these work experience programs may suffer from the stigma of serving the poor or disadvantaged,[23] evidence about mainstream employer training of lower-level workers is not encouraging. As mentioned above, the majority of corporate training goes to older workers or those with higher levels of education (Tan, 1989). Observations of informal on-the-job training of the less educated suggest that the quality of this training is uneven at best, heavily dependent on who happens to be around to provide the training. In work groups with high turnover, "almost novices" train the actual novices, a situation that violates models of good apprenticeship training (Scribner and Sachs, 1990).

Moreover, there may be a conflict between the apprentice as worker and the apprentice as learner. The apprentice will always learn something on the job, but unless the work component of the apprenticeship is deliberately designed to include formalized instruction, the educational program is likely to have gaps and inefficiencies. Such structure is difficult to implement and maintain; even in Germany, where there is a strong system of regulation and oversight, high-quality training is not always provided.

A related problem is the training experience of the adult mentors, on whom a good apprenticeship system must depend. In Germany, the workers who provide the mentoring were for the most part apprentices themselves. In a large-scale apprenticeship system in this country, the first generation of mentors would participate in training that they did not experience as learners.

Education on the Job in the Four Types of Programs

This broad picture suggests many problems with mass employer participation in youth apprenticeship, as well as the actual content of on-the-job pedagogy, but how have these issues been handled by the school-to-work models in this report? All four models place a high priority on using the workplace to provide a meaningful, high-quality learning experience for their students. Yet all

[23]Some research suggests that employers are reluctant to hire participants in programs expressly designed for the disadvantaged (Burtless, 1985).

of the programs fall short in effectively using the worksite as a classroom/instructional environment where students are taught by their employers. Despite the growing enthusiasm for placing workers into productive, responsible jobs and teaching them in the workplace, few programs require participating employers to teach, settling instead for the presumed benefits of students' exposure to an actual workplace. In all of the programs addressed below, educators work with and solicit support from the business community, but the success of educators in getting and using business support, and the effectiveness of the education that actually takes place on the job, have sometimes been limited.

Agricultural education has had great success in incorporating activities outside the classroom into students' educational experience. However, these activities are not the type of on-the-job educational experience typical of co-op education or traditional apprenticeships in which the student is employed and participates in the work of the firm. The "work experience" in agricultural education is organized around extracurricular activities and clubs such as 4-H and Future Farmers of America (FFA), and much of the learning is achieved through student-initiated projects. These projects provide opportunities for young people to work with adult role models as well as to work in groups with their peers. They also impart a variety of occupational and entrepreneurial skills.

Many of these projects are conducted as Supervised Occupational Experiences (SOEs). SOEs are usually 12-month projects conducted outside the classroom that focus on an agricultural subject relevant to the community. SOEs give students actual work experience, develop their applied skills in basic math and science and in technical agriculture, and link them to the larger agricultural community and, thus, to potential employers. The occupational experience for agricultural education students is

> designed to develop the mental and manipulative skills, technical knowledge, work habits and leadership skills essential to succeed in an occupation. . . . [It] stresses the development of competencies that will give students a competitive edge in the work force and also increase their occupational and educational options. (McCormick, 1988)

These experiences provide a means whereby students can contribute to their economic and personal independence by "making money, doing something worthwhile, developing self-confidence and self-esteem, assuming responsibility and obtaining job satisfaction" (McCormick, 1988). Local employers and the agricultural community have customarily joined with educators to support and participate in these meaningful, albeit nontraditional, educational activities. The productive relationships between educators and employers have, in the past, been relatively easy to nurture, owing to the characteristics of the agricultural industry. Unlike other vocational education programs, agricultural education has

a solid base of 4-H and FFA alumni to carry on the traditions of the program.

Whereas agricultural education appears to have effectively incorporated nonschool activities into the educational experience, **Tech Prep** has yet to achieve a balanced relationship among high schools, community colleges, and employers. This model tends to focus on the articulation between secondary and post-secondary education. In many Tech Prep programs, the links to employers are tenuous and structured workplace learning is incipient at best.

Most programs, such as North Carolina Tech Prep, which has expanded from 11 to 39 districts throughout the state even without increased funding to spur its growth, focus on the way that secondary classroom education can be linked to community college work in an effort to prepare future workers. Although integrating the employer community is essential to Tech Prep programs of this kind, employers are not considered teachers. Rather, they are looked to as advisers to help design courses of study based on their needs and workplace demands, as noted by Joe Grimsley, president of Richmond Community College in North Carolina, describing the joint venture between the Richmond County Schools and Richmond Community College in 1986:

> The bottom line is our hope that, with Tech Prep, we can help high school students make a smooth transition to a community college campus . . . [and that] the program succeeds because it provides an integrated way to connect essential skills learned in high school with occupational-specific skills taught at the community college level. (Scott, 1991)

On the other hand, other Tech Prep programs emphasize that their primary goal is to create a direct link with employers, and that community college articulation is only the means of achieving that goal. This link, however, rarely goes beyond employer participation in development, design, and promotion of the program. Tech Prep in Delaware includes "craft committees" in curriculum development for "each course of instruction taught in each school." These committees work alongside members of the business community to "advise the district on policy and procedures related to curriculum development or revision . . . [and] serve as outreach agents into the community" (Delaware Consortium on Technical Preparation Programs, 1991). Similarly, the Illinois Manufacturing Tech Prep Project uses a network of business professionals including a public/private steering committee, two statewide advisory groups, an employer advisory group, and an educator advisory group to direct its programs. The employer advisory group (which has four public/private working committees), together with the Center for Governmental Studies at Northern Illinois University, has attempted to address a diverse set of issues, including funding, program accountability and performance, steering committees, advisory groups to develop a framework for industry skill

standards, work-based learning models, marketing plans for further promotion to the business community, proposals for parallel programs for out-of-school populations, student recruitment, and program coordination.

Health care employers are helping Boston Tech Prep to reform the current high school program in an effort to gear students toward earning an associate's degree and a certified professional credential in the health care field. Students not only benefit from feedback provided by employers in their chosen field but also receive full-time hospital jobs in addition to training both in the classroom and at work. Community colleges play a part in this program by providing the means whereby students can achieve advanced certification if desired.

Overall, the legislative model for 2+2 Tech Prep as articulated by the Carl Perkins Act encourages business support and involvement in program areas from job training to curriculum development, but does not address the nature of on-the-job learning and pedagogy. In the end, the fundamental characteristic of Tech Prep remains high school/community college articulation, not instruction on the job.

Similarly, **career academies** have promoted educator/employer collaboration but have not developed the workplace as an instruction site. Academy programs in California are organized around a three-way partnership among state school districts, local school districts, and supporting companies. Whereas employer participation in the instructional and experiential aspects of agricultural education is largely on an individualized, voluntary basis, employer participation in academy programs in California is actually legislated to encourage financial participation by local businesses. The state grant for academy programs must be matched in funds or in-kind by the local school district and the local business community. Legislators have adopted this "money where your mouth is" policy in the hope that businesses will assume a vested interest in the academy process.

Evaluations of the California programs indicate that work experience is the most critical part of the education process for academy students. (Dayton and Stern, 1991; Dayton et al., 1992). Public/Private Ventures also reviewed these programs and concluded that the California academies are the "best single model in the country for business involvement in schools" (Raby, 1990). Unlike other business partnership programs in which businesses pay lip service to educator needs, or provide only token assistance, academy programs require businesses to "get their hands dirty" in the process of educating youth. Apparently the academy approach is working.

Student employment experiences are not simply menial jobs, but well-paying, substantive opportunities for youth to complement their academic work to experience firsthand their chosen career field. Students have the chance to make presentations, create and articulate ideas, and even

apply for jobs as if they were actually in the workforce.

California's academy model, as implemented in the Pasadena School District (Pasadena Partnership Academy), requires full-time summer employment in local jobs for those performing well in their academic courses. Students who are not up to the academic standards set by the program are required to attend summer school for academic assistance. When California academy students enter the spring semester of their senior year they are given afternoons to gain additional part-time work experience in local firms.

Funding, planning, provisions for facilities and equipment, and teacher training are all pivotal dimensions of academy programs provided through business involvement. Additional support from the community is provided through the development of advisory boards and councils, comprised predominately of members of the business community. As in California, these committees often become involved in policy issues as well as being major contributors to curriculum development (Reller, 1987; Dayton, 1989).

California academy business partners have become deeply involved with the programs and are credited with helping to shape replication and expansion legislation in the state. Through business support in the state legislature, the governor and house were convinced to fund 10 new academy initiatives in 1985-86. Furthermore, state support for academy programs was increased from $150,000 in 1984 to $2,000,000 in 1989-90, and covers 40 replication projects (Raby, 1990).

Although the growing employer involvement in academies is encouraging, much of it is focused on the schools themselves. The nature of the learning that takes place in the workplace is still not well understood.

In contrast to the other models discussed here, **co-op education** is based in the workplace. Without the cooperation of employers, the program would not exist; thus, the existence of the program suggests that a workplace-based program that involves thousands of young people can exist in the United States. Nevertheless, co-op education remains a relatively small program that has actually shrunk over the last decade, which is particularly puzzling given the good press it has received (U.S. General Accounting Office, 1991; U.S. Department of Labor, 1988b). Certainly one of the problems is the difficulty of recruiting and retaining employer participants. As far as we can tell, there has been no research that has tried to analyze the potential for expansion or that has even made a systematic analysis of the types of employers involved and why employers do or do not participate.

Furthermore, we know very little about the quality of job placements in co-op education. Stern and his associates have examined the quality of co-op jobs through interviews with participants.

When compared to co-op students who hold jobs that they found on their own, co-op students in school-supervised jobs are "more likely to use reading, writing, math and other skills on the job; learn new things; have more autonomy; find the work more intrinsically motivating; and acquire information or motivation on the job that helps them in school" (Stern et al., 1991). But it is not clear that, for the purpose of evaluating the apprenticeship model, the standard against which on-the-job learning should be judged is alternative term-time employment. The question that needs to be addressed is whether a significant part of the basic education of the country's youth should be moved from the classroom to the workplace. Thus, learning on the job should be evaluated against learning in the classroom, not after-school part-time work.

The 1991 study of co-op education by the U.S. General Accounting Office (GAO) gave some consideration to the quality of co-op placements. The authors established some criteria for what they referred to as effective programs, including "written and signed training agreements outlining specific responsibilities of the student, employer, coordinator, and often times parent involved with the co-op" and "employer responsibility including training and assisting in supervision and assessment of student performance." While these criteria suggest attention to the quality of learning in the co-op placement, GAO did not try to determine the share of "effective" co-op placements, nor did they test the effectiveness of these characteristics systematically. Indeed, the study limited its investigation to co-op programs that were recommended as "high quality by researchers and practitioners."

Simulating Authentic Work Experience in School

If recruiting employers is difficult and the outcomes of their instruction efforts uncertain, an alternative might be to reproduce the characteristics of work within the school, or at least outside of the workplace. Before attempting this, critical feasibility issues need to be addressed. Many vocational high schools and community colleges already have labs and shops where students can learn many of the work tasks that they may need later, but simulation of the workplace requires a much more fundamental reform that would allow students to experience and practice the full complex of skills, social behaviors, and interactions that they would encounter outside of the classroom. Can the operation and pedagogy of schools be reformed so that they can break down the barriers between school and work without having to absorb actual workplaces into the core of the education system?

We have already discussed examples of the simulated workplace approach. Future Farmers of America, 4-H, and Supervised Occupational Experience in agricultural education are programs that provide nonschool, structured learning opportunities but do not necessarily involve work in an actual

worksite. However, they do rely heavily on the participation of employers as volunteers.

Below we shall briefly discuss two alternative approaches: school-based enterprise and cognitive apprenticeship.

School-Based Enterprise

One common way of bringing authentic nonschool experiences into the school itself is through school-based enterprise (SBE).[24] Stern defines SBEs as "an activity sponsored or conducted by a school, that engages a group of students in providing services or producing goods for sale or use to people other than the participating students themselves." SBEs are common in vocational programs and include printing services, haircutting, auto repair, construction projects, and others. School farms have been particularly important for agricultural education.

There are four common goals of SBEs: "to teach entrepreneurship, to provide application of skills and knowledge taught in other courses, to enhance students' social and personal development, and to stimulate economic development." Although there has been no formal evaluation of the effectiveness of these programs, students and teachers are usually enthusiastic about them, and they appear to be more valuable learning experiences than alternative employment that high school students might obtain for themselves outside of school (Stern, 1982).

In comparison to apprenticeship, SBE has the advantage of avoiding the need to recruit and retain employer participants. On the other hand, there would also be significant problems in expanding SBE to involve a significant proportion of high school students. Developing the teacher corps, the capital, and the markets for enough SBEs to enroll millions of students would be a formidable project. Perhaps it would be more feasible to use them in combination with or as a supplement to apprenticeship.

Cognitive Apprenticeship

Another pedagogical strategy that has some of the advantages of youth apprenticeship yet need not rely on extensive employer participation is referred to as cognitive apprenticeship (Collins, Brown, and Newman, 1989). While cognitive apprenticeship does not actually simulate the workplace, it is designed to simulate the type of learning that would take place on the job. The strategy is based on the model of traditional craft apprenticeship, in which apprentices (novices) are involved in a process of learning and absorbing the knowledge and expertise of skilled workers

[24]This discussion on SBE is based on Stern (1990, 17-24).

(masters, teachers). In effective apprenticeships, the "teacher" continuously engages in the practice being learned. The apprentice learns by observing the activities of the master and trying to perform them with help and guidance.

One of the goals of cognitive apprenticeship is to apply the principles of traditional craft apprenticeship to skills such as reading, writing, and mathematics that are less easily acquired through observation of a master or teacher. The model challenges the distinctions between academic and vocational education.

The actual method that cognitive scientists propose usually involves teams of students working on relatively complex tasks. Researchers have applied the cognitive apprenticeship strategy to projects such as redesigning the USS *Constitution* (Salomon, 1990), building a solar-powered car (National Council on Vocational Education, 1990), and designing the interior of a house (Stasz et al., 1990).

The significant point for the purpose of our analysis is not what specific skills are taught through cognitive apprenticeship, but rather that the apprenticeship method can be used in the classroom: that is, the method that characterizes high-quality learning on the job can also be used in the classroom.

Conclusion

Business participation in the country's education system appears to be growing, often involving various types of assistance to schools. But what the apprenticeship model advocates is a long way from adopt-a-school programs, or the participation of a vice president for community relations on an advisory board, or some mentoring or donated equipment. The model calls for the transformation of workplaces into integral parts of the nation's basic education system. None of the four school-to-work models that we have examined in detail here even approach the level of employer involvement implied by the youth apprenticeship model.

If even the moderately ambitious youth apprenticeship proposals are to become reality, we must address the issues of both employer participation and on-the-job pedagogy. These two issues are closely linked. If employers need to be cajoled into participating, educators lose their leverage to demand that employers improve the educational experience that they offer their apprentices. It is likely that the interests of the employing firm will in many cases diverge from those of the apprentices employed there. If this is true, the market will not provide incentives for firms to search out the best educational strategies. A large-scale apprenticeship system would inevitably involve many

workplaces that provide seriously deficient education and training.

There are educational strategies that can be used in schools or other community institutions and that incorporate many of the advantages of a structured workplace experience. These appear promising, they avoid the problems of employer participation, and, unlike the actual workplace, they can be structured explicitly to enhance learning. Nevertheless, one of the advantages of the youth apprenticeship model is that it forces an institutional relationship between schools and employers. With school-based "apprenticeships," this linkage would have to be established in some other way. Finally, even though school-based enterprise, cognitive apprenticeship, and other similar strategies may work well in pilot projects, education reformers will face many of the same problems in implementing them on a large scale as they face in expanding youth apprenticeship.

VI. CREDENTIALING

> Credentialing is perhaps the principal barrier to the fulfillment of the promise of the expansion of structured work-based training in America.
>
> (Grossman, 1990)

Academic and occupational certification and credentialing are increasingly controversial topics in the discussion of education reform. The School to Work Transition and Youth Apprenticeship Act, introduced in the House of Representatives in April 1992, gives credentialing top billing as it promotes the achievement of "skills standards" for program participants. The legislation defines these standards as:

> industry-based occupational proficiencies that establish the skills that are required by an industry, which shall be marked to world class levels of industry performance tied to measurable performance based outcomes that can be readily assessed and are comparable across industries, similar occupations and States. (U.S. Congress, 1992)

There are many academic, professional, and legislative arguments that promote assessment and certification, but recent discussion has focused on the role that credentials can play in certifying to employers that a given level of skill or knowledge has been reached. In Germany as well as the United States, successful completion of an apprenticeship (which involves some form of final assessment) signals a given level of skill. Nationally recognized apprentice credentials would allow workers to move throughout the national labor market, since all employers would have a clear idea of the skill level and capabilities of credentialed job applicants.

Although the value certifying a graduate's knowledge is hardly controversial, consensus breaks down around the specific content of assessments that would lead to certification. Definitions such as the one above are easily discussed in the abstract, but, when moved into a practical realm, face a myriad of implementation issues complicated by conflicts of interest. The certification problems of youth apprenticeship are particularly difficult, since the strategy is designed to provide a broad educational foundation through experience and instruction in a specific occupational or industrial area. All apprenticeship advocates agree that graduates should be qualified not only to go directly into the labor market, but also to pursue higher education if desired. Therefore, how specific or narrowly defined should the certified skills be? Should graduate apprentices be able to do well on the SAT? Should they be considered skilled craft workers in a particular occupation? Or should there be some attempt at defining a middle ground between these academic and vocational extremes? In some sense, the problems of assessment and credentialing are subordinate to the youth

apprenticeship issues that we have already addressed concerning the target population, the educational content, and the nature of learning and activity on the job. Choices about these issues will determine the appropriate form of assessment and credentialing, although even if the broader strategic issues are resolved, difficult technical questions will remain about how to assess and certify the specified goals.

Issues concerning the breadth of certification continue to be discussed in Germany. Traditionally, there have been more than 500 occupations for which credentials could be earned. But in a movement similar to the clustering strategy used in Tech Prep and other U.S. programs, German educators and employers are combining many of these narrowly defined occupations into broader training groups, in order to broaden the opportunities available to apprentice graduates in terms of both future education and employment (Hamilton, 1990).

All of the programs described in this paper address the need for credentials on some level, but some of the **Tech Prep** efforts have perhaps gone farthest in developing assessment and standards. In 1990, the American Technical Education Association (ATEA) established national minimum standards for all Tech Prep programs (McGrath, 1991). Tech Prep advocates have argued for many years that in order for employers to be able to recognize Tech Prep graduates as qualified workers, the students must have obtained certain established competencies/skills that are valued by employers. Competency guides were established early in the history of Tech Prep: the North Carolina State Department of Instruction devised job-task inventories, instructional objective guides, and standardized subject matter as part of a four-year project during 1974-78 that involved 11 county and city school systems and 8 community colleges (Scott, 1991). Today the ATEA requires the following minimum standards of all two-year Technical Education Programs "as guidelines to pattern postsecondary technical education programs":

- a definition of technical education;
- recommended minimum professional standards for hiring technical instruction personnel;
- incorporating American Technical Education Association objectives;

  technical/occupational two-year minimum standards;
- a range of educational choices for students;
- student activities conducted by skilled technicians;
- well-defined educational levels and job attributes;

- standards of education for awarding associate's degrees in programs of technical-occupational education;
- a summary of minimum standards; and
- programs leading to associate's degrees and certificates (McGrath, 1991).

In response to the country's swing toward skilled technical occupations, programs such as Georgia's Applied Manufacturing Technology Work-based Learning Program and Project Mechtech in Maryland are initiating some standardization measures or credentialing for their students. The ultimate goal of programs such as these is to provide some certificate of training that is accepted industrywide. Maryland's Apprenticeship Training Council is developing standards for Project Mechtech, while Georgia students already receive a two-year certificate in Manufacturing Tech upon community college completion that is acknowledged by state manufacturers.

The Illinois Manufacturing Tech Prep Project has integrated skill recognition into its project design, concentrating on industry standards for precision metal workers, chemical technicians, and industrial maintenance technicians. First, program planners worked with industry participants to identify and define industry skill standards and requirements for manufacturing technology occupations. These requirements were then integrated into the Tech Prep curriculum by combining math, science, language arts, and manufacturing technology courses with hands-on experience (Illinois State Board of Education and Illinois Job Training Coordinating Council, 1991).

Tech Prep programs must also establish standards for high school students to enter the community college phase of the program. In some cases, students must possess a specified set of competencies to enter post-secondary institutions (Dornsife, 1991). In the Oregon system, a junior or senior must earn an A or B on a test administered by the community college and enroll in at least a three-credit course in the community college within one year of graduation to receive high school credit for the program. Advanced skill competence courses require completion of a competency profile (for entry-level tasks) signed by the high school instructor before credit is issued; certified competency usually requires the completion of three classes in the appropriate program area.

Competency-based curricula such as those in many Tech Prep programs have not been as extensively developed in the **academies**, which rely more on informal contact with participating employers to determine the skills that students are learning. Many programs solicit business input in designing educational and occupational goals for students, so that academy staff and employers have some sense of the skills that students will acquire in these programs.

Agricultural education has also started to develop more assessment and credentialing tools.

Competency-based agricultural education courses have been developed in states such as Louisiana and Connecticut by the State Department of Education. One such project to establish and achieve vocational agricultural education standards in Louisiana took two years to develop and was jointly directed by the state's Office of Vocational Education, the Trade and Industrial Education Bureau, and the Vocational Curriculum Development and Research Center. Competency-based courses were developed in three agricultural subjects (agricultural mechanics, forest technology, and horticulture), as well as in 13 other areas not specifically agricultural. These areas include a diverse set of occupational specialties ranging from human resources and business practices to air conditioning and heating; brake, steering, and wheel systems; transmission and differentials; and hay and forage harvesting equipment. Each course of study requires the completion of 1,688 hours of course/practical work over a 15-month period (Louisiana State Department of Education, 1987).

Similarly, Connecticut has 28 competency-based units of high school study in the disciplines of agricultural mechanics, animal science, plant science, natural resources, and aquaculture. A four-year program is offered in each discipline. The first two years, grades 9 and 10, include 10 exploratory units with an emphasis on fundamental skills development through courses such as power tools, plumbing, small engines, tractor operations, and woodworking. Years 3 and 4 (11th and 12th grades) include 18 specialized units elected jointly by the student and faculty, designed to best prepare students to meet their individual vocational objectives. Common study areas for these units include career awareness, agribusiness management, leadership development through Future Farmers of America, and supervised, practical experience in such topics as advanced agricultural welding, agricultural machinery, machinery/farm tools repair and maintenance, agricultural structures, alternate energy sources, and diesel fuel systems. The program comes complete with regional centers that are staffed by three or more teachers with vocational agricultural expertise in one or more of the four major areas of study (Connecticut State Department of Education, 1985).

The **co-op education** system lacks any specific certification procedures. Co-op programs rely on soft vocational credentials such as a letter of recommendation from the employer in addition to a standard high school diploma (U.S. Department of Labor, 1988b). The U.S. General Accounting Office (1991) reported that participation by students even in high-quality co-op programs "is not widely recognized as evidence of skill mastery," and that some of the high school coordinators contacted for their research indicated that student certification of industrywide skill standards is one way to improve co-op programs' success. The report concluded that:

> the use of industry-wide training standards *could* provide a focus for training plans, resulting in more uniform high-quality training for co-op, and provide a means for evaluating program achievements. (Emphasis added)

However, the establishment of such training standards remains but a vague goal for most co-op programs.

Conclusion

The credentialing movement at this time appears to be ad hoc. In some cases, such as co-op education, no specific credential is awarded upon program completion. In some other programs, such as the academies, curricula are worked out with local employers; therefore, successful completion of the program implies achievement of some level of industry-accepted knowledge and skills. Still other programs have developed more formalized competency-based assessments. In general, the more specific and narrowly defined the occupational goals of a program, the easier it is to develop standards and credentials; as programs move toward a model such as youth apprenticeship in which specific occupational training is used to provide a broad educational foundation, credentialing becomes more problematic.

A possible solution is to develop tests for broad foundation skills. The influential 1990 report of the Commission on the Skills in the American Workforce called for a Certificate of Initial Mastery that all students should achieve by age 16. The Commission indicated that standards should be "established nationally and benchmarked to the highest in the world." It recommended "a series of performance based examinations for which students can explicitly prepare" and for which they can "collect credentials over a period of years," but did not actually define the standards.

Also in 1990, the U.S. Secretary of Labor established the Secretary's Commission on Achieving Necessary Skills (SCANS) to determine which basic skills are needed in the workplace. A central part of the Commission's charge is to propose acceptable levels of proficiency in "workplace know-how" and suggest effective ways to assess that proficiency. The Commission published two reports that met with mixed reviews. It called on schools to teach students interpersonal skills and how to effectively utilize resources, information systems, and technology. However, the Commission gave little guidance on how to measure and evaluate the skills and activities of students and schools that it identified as being important.

The suggestions of both these commissions have struck a chord among policymakers and educators, and a number of state and local efforts are under way to develop competency standards and assessment systems to turn these visions into reality. However, little progress has been made in

the actual development of nationwide methods to standardize certification.

Currently, the value of a particular diploma or certificate, and what it implies to employers, depend almost entirely on the reputation of the educational institution that conferred it. In many cases, the reputation is not known beyond the local area in which the institution is located. If students leave that area, as many do in such a mobile society, the credential means very little. To be sure, there are many technical problems with developing standardized assessment and certification of skills – for example, how can tests be designed so that they are fair and are good measures of relevant skills and abilities? Further, a nationally recognized and accepted system of credentialing can be developed only when the broader underlying issues concerning purpose, content, and feasibility are confronted from not only the educator and student perspectives but from the employer perspective as well.

VII. CONCLUSIONS AND RECOMMENDATIONS

In this final section, we summarize the main conclusions of the paper and discuss their implications for the future of school-to-work programs in general and of youth apprenticeship in particular. We end with some general suggestions for further research and pilot or demonstration projects.

Conclusions

Our approach to the analysis of youth apprenticeship broke down the model into four components: student participation, educational content, location of instruction, and credentialing. Broadly speaking, the programs that we analyzed suggest cautiously optimistic conclusions about the feasibility of the youth apprenticeship model with respect to student participation and educational content. One of the most serious potential problems with the model concerns location of instruction – that is, whether the workplace can effectively provide a significant portion of the education for a large segment of American youth. The problems with developing appropriate credentials are also far from being solved, but they can only be confronted seriously when more progress is made on the issues of target group, content, and location. Once we have a clearer understanding of the scope and goals of a youth apprenticeship strategy, we can make progress on the complex technical issues involved with assessment and certification. These general conclusions are elaborated in the following paragraphs.

Although many of the programs that we examined initially focused on youth with serious educational or economic problems, they have effectively broadened their target population to at least a group that could loosely be considered non-college-bound. The academies and Tech Prep, as well as at least the extracurricular components of agricultural education such as 4-H and Future Farmers of America, seem to have escaped the negative connotations of traditional vocational education. One way that programs try to broaden their student base and escape the "at-risk" stigma is to become more selective. Not surprisingly, this creates the potential for creaming. The opening of these programs to more academic students – those explicitly headed for baccalaureate degrees – is more problematic, although there is some room for optimism. Some college-oriented academies have been developed in Philadelphia and California, although their diffusion has been slow. Tech Prep is inherently oriented toward higher education, but it raises the problem of community college versus baccalaureate stratification. Student transfers to four-year colleges are rare and, indeed, only a

minority of community college students earn their two-year degrees. Nevertheless, many of the different types of programs that we examined do reach a broad range of students (although some programs may be more restricted), and they have the potential for even wider participation.

A great deal of progress has been made on reforming educational content – in integrating academic and vocational education, for example, through applied technical courses. Such integration is still seen as a reform of vocational education – that is, more academic material has been included in occupational or technical courses and programs, and less vocational or overtly applied material has been included in traditional academic courses. In addition, most of this progress has been made in the classroom rather than the workplace components of the programs. Agricultural education is an interesting case because it has combined academic and practical skills instruction with training in more amorphous capabilities such as leadership and problem-solving. In any case, the reform of educational content is a dynamic field where there is also more potential for progress.

The role of the workplace is the greatest potential problem with the apprenticeship model. Little is known about the learning that takes place on the job. We must also confront the contradictory problems of recruitment of often reluctant employers, potential resistance of adult workers, and the need to assess and improve the quality of learning on the job. The youth apprenticeship approach may very well come apart on this set of issues. Serious monitoring and improvement of on-the-job pedagogy is extremely problematic in a system based on voluntary employer participation. Although there are undoubtedly many public-spirited employers who will do the best they can, in many cases employers will not stray far from their perceived interests. It seems likely that educators will quickly back down from demanding improved on-the-job learning if employers threaten to pull out. Also, in most cases, there will be no independent – or even semi-independent – voice representing the interests of the workers and the apprentices. These problems are less serious in Germany because of mandatory employer membership in chambers and the continued strong role of unions.

The experience with employer participation in co-op education is particularly interesting. Among the programs that we have examined, co-op is the only one that relies fundamentally on employers. Despite positive press, co-op education has remained marginal in the education system, possibly owing to the "dumping ground" stereotype it has often been unable to escape. Moreover, the currents of reform in educational content also do not appear to have had much effect on co-op education, we suspect because it is so firmly anchored in the workplace. The problems of employer

participation probably explain why, after two years of very enthusiastic advocacy for apprenticeship by the U.S. Department of Labor and many of the country's most influential foundations, there are still only a handful of apprenticeship pilot projects, which probably enroll a total of fewer than 1,000 students.

Efforts to simulate effective workplace learning outside the workplace, such as school-based enterprise and cognitive apprenticeship, appear to have potential. Their freedom from reliance on employers is both a strength and a weakness. The interactions between schools and employers that youth apprenticeship would require is one of the advantages of the model; simulation approaches would not necessarily foster these links. Furthermore, as is the case with youth apprenticeship, school-based models face profound barriers to large-scale implementation.

Implications and Recommendations

Policy Implications

Based on our assessment, development of a large-scale youth apprenticeship system in which a significant part of the learning takes place on the job is a long way off. One strategy would be to build on the primarily school-based models such as academies and Tech Prep. Although these two models presume some employer participation, they place a much smaller burden on employers than others. Certainly schools should continue to work systematically toward strengthening relationships with employers, but they have to confront the possibility that employer interests may not coincide with providing the best educational experience for students. Educators must be willing to let employers terminate their participation under some circumstances. If we are serious about a true incorporation of the workplace into the education system, then there is no escaping the need for an appropriate set of institutions to regulate workplace education. In addition to these institutions, we will probably need a set of incentives to encourage employer participation. The development of this type of policy is a long-term project, to say the least.

In the meantime, school-based programs can move forward on the other issues – broadening the clientele, furthering the integration of academic and vocational education, and improving assessment and certification. Progress in these areas may well encourage the employers to become involved.

Promising approaches toward classroom simulation of effective on-the-job learning should also be pursued. If we understand better how this can be done, that may also help us in working with employers to strengthen the learning experience of their apprentices or trainees.

Research Implications

A research agenda needs to evaluate further the effectiveness of the components of the apprenticeship model (and the programs that share some of those components), and to develop a better understanding of some of the practical and political barriers to implementation so that they can be overcome. The following is a list of some key areas for research.

1) There appear to be many lessons to be learned from agricultural education. Unfortunately, most of the available evidence on its effectiveness has been produced by enthusiastic advocates. As a result, the many positive reports need to be viewed with some skepticism. Nevertheless, agricultural education is worth more scrutiny. This could include more systematic studies of its effects; an analysis of the implications for its effectiveness as it shifted from a family-farm-based program to one that serves a more industrialized agricultural sector; and the extent to which the agricultural milieu is simply so unusual that lessons from the programs are of little use in other situations.

2) We need to know more about the extent to which college-bound or more academically oriented students can benefit from applied programs. One place to start might be a more systematic analysis of the post-secondary education experience of the graduates of the types of school-to-work programs discussed here. A better understanding of the career patterns of graduates of vocationally oriented community colleges would also help shed light on this subject. A good deal could be learned from both pilot or demonstration projects, as well as case studies and data analysis (probably involving data collection).

3) We need more information about the experience of minorities in apprenticeship-like programs. We raised the potential problems with discrimination that might result if the workplace takes on a more central role in the general education system. Discrimination may also be an issue if programs become more selective as they improve.

4) Both Tech Prep and the academies need more systematic impact evaluations. We would also like to see a more detailed analysis of the experience of Tech Prep students. Tech Prep is an occupationally oriented program that encourages youth to pursue post-secondary education. Does Tech Prep effectively broaden their opportunities, or do they end up in programs that they never finish? Can individual Tech Prep students be categorized as more academic or more vocational and, if so, is there any difference in their experience?

5) We also need a better understanding of the current and potential incentives that employers have for participation in youth apprenticeship or other school-to-work programs. An analysis of

employer participation in cooperative education might be one place to start. This could be related to a broader economic analysis of training currently provided by firms. A critical look at the educational content of co-op programs could help us to understand the potential for conflict between employer interests and the creation of effective structured learning experiences on the job. This knowledge could lead toward the development of appropriate labor market institutions and incentives to encourage and regulate employer participation in youth apprenticeship.

6) There are some research opportunities for analyzing the participation of German companies in that country's apprenticeship system. As we pointed out, only a minority of German firms participate, yet the system is largely successful. Although the U.S. and German systems are very different, the German experience could provide some useful insights for this country.

7) A central emphasis of this report has been the issue of on-the-job pedagogy. Not surprisingly, educators have not thought much about how to design or evaluate on-the-job learning experiences. It would be worth learning more about how the German and other European communities do this. There may also be some lessons for effective on-the-job education to be derived from experience with corporate training. In addition, many of the operators of current school-to-work programs have probably tried to strengthen their on-the-job components, yet there has been no systematic account or evaluation of their experiences.

8) We should encourage more thinking and research on classroom simulation of structured work-based learning and its benefits. What are the barriers to expanding these programs on a large scale, and is there a way to design them so as to encourage stronger links to employers?

9) Rather than trying to solve the certification problem in the abstract, efforts to strengthen assessment and certification need to be integrated into a broader discussion about the nature and scope of youth apprenticeship and other school-to-work programs.

Many barriers stand in the way of the development of a large-scale youth apprenticeship program. Nevertheless, we believe that the education reform discussion, of which youth apprenticeship programs are a part, is extremely important. Many of the reforms that are associated with apprenticeship can make fundamental contributions to the broad movement to strengthen education. These include efforts to break down the distinctions between learning and working, school and community, academic and vocational instruction, and college-bound and non-college-bound students; to foster interactive links between schools and employers; to incorporate authentic work-related learning into the education of large numbers of adolescents; and to address the issues of assessment and certification within a broad and comprehensive framework. Current models of youth apprenticeship may have to evolve into strategies that will make them appropriate for the economic,

cultural, and institutional context of the United States. In any case, the experience that we gain through efforts to develop youth apprenticeship models and their components will certainly lead to a more effective education system in the United States.

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The Manpower Demonstration Research Corporation (MDRC) is a nonprofit social policy research organization founded in 1974 and located in New York City and San Francisco. Its mission is to design and rigorously field-test promising education and employment-related programs aimed at improving the well-being of disadvantaged adults and youth, and to provide policymakers and practitioners with reliable evidence on the effectiveness of social programs. Through this work, and its technical assistance to program administrators, MDRC seeks to enhance the quality of public policies and programs. MDRC actively disseminates the results of its research through its publications and through interchange with policymakers, administrators, practitioners, and the public.

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